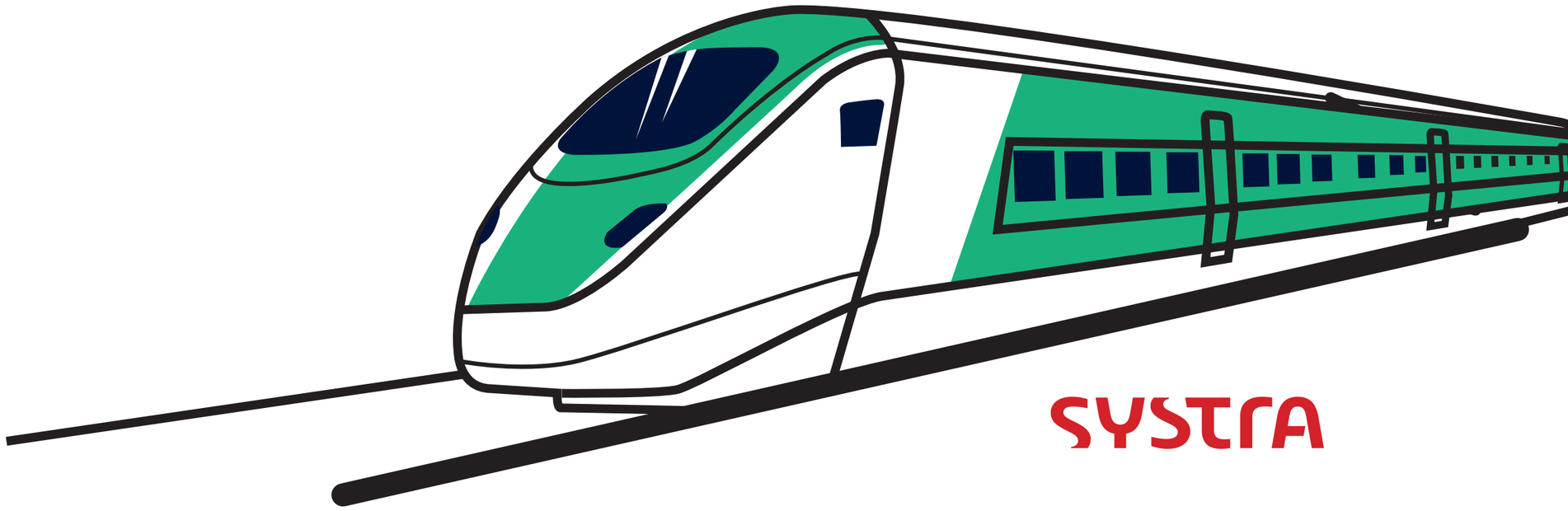
KERALA RAIL DEVELOPMENT CORPORATION LTD

DETAILED PROJECT REPORT

VOLUME VI - ALIGNMENT REPORT: DRAWINGS ANNEXURE

SEMI HIGH SPEED RAIL CORRIDOR
THIRUVANANTHAPURAM TO KASARAGOD



DETAILED PROJECT REPORT

VOLUME VI - ALIGNMENT REPORT: DRAWINGS ANNEXURE

SEMI HIGH SPEED RAIL CORRIDOR
THIRUVANANTHAPURAM TO KASARAGOD

SILVER LINE ALIGNMENT FOR THE DETAILED PROJECT REPORT FOR THIRUVANANTHAPURAM TO KASARAGOD (SEMI HIGH SPEED RAIL CORRIDOR)

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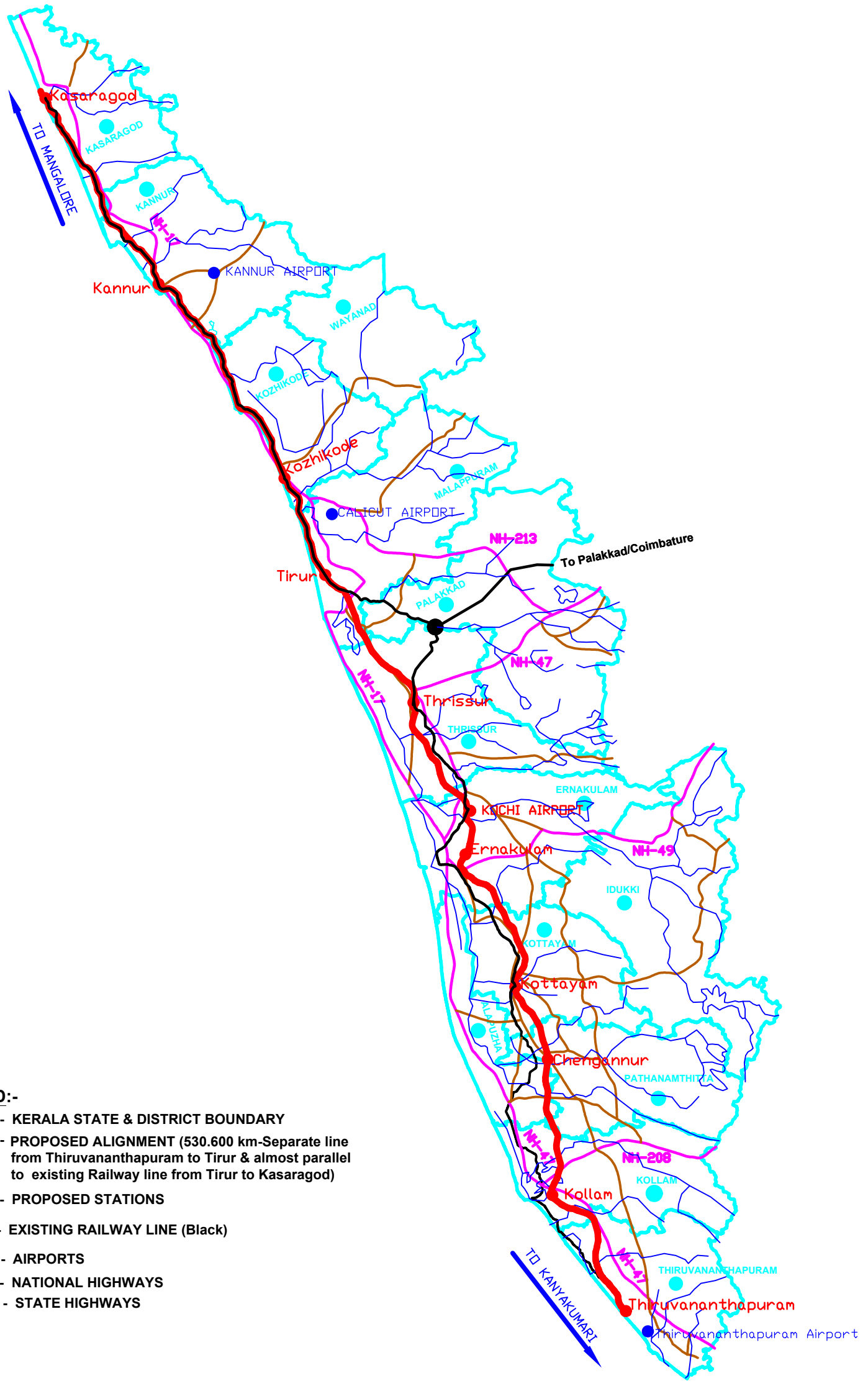
ROUTE MAP FOR THE THIRUVANANTHAPURAM-KASARAGOD SILVER LINE (SEMI HIGH SPEED RAIL CORRIDOR)



LEGEND:-

- KERALA STATE & DISTRICT BOUNDARY
- PROPOSED ALIGNMENT (530.600 km-Separate line from Thiruvananthapuram to Tirur & almost parallel to existing Railway line from Tirur to Kasaragod)
- PROPOSED STATIONS
- EXISTING RAILWAY LINE (Black)
- AIRPORTS
- NATIONAL HIGHWAYS
- STATE HIGHWAYS

Client :	Project Title:	Drawing Name:	General Consultant :	Drawing Scale :
K-rail Address: K-Rail Development Corporation Ltd 5th Floor,Trans Towers, Vazhuthacaud,Thiruvananthapuram,Kerala-695014	SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD	INDEX MAP Drawing No: SYSTRA / KRDCL / SHSR / DPR / 2020 / AL /	SYSTRA	Sheet No : 01 of 01

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
												First Submission

SilverLine Between Thiruvananthapuram to Kasaragod
Details of Horizontal Curves

Sl No.	Curve No	Radius of Curve(m)	Chainage (M)		Curve Length (m)	Transition length (m)	LH/RH	Between Stations	Remarks
			Start	End					
1	C1	400	-831.109	-618.796	212.313	2x50=100	RH	TVA - TVM	On Shunting Neck ML
2	C2	3000	927.137	1272.755	345.618	2x130=260	LH	TVM - KLM	
3	C3	3000	1460.718	2655.252	1194.534	2x130=260	RH	TVM - KLM	
4	C4	1850	3969.974	4865.966	895.992	2x180=360	RH	TVM - KLM	
5	C5	4000	5018.709	5404.301	385.592	2x130=260	RH	TVM - KLM	
6	C6	1850	5967.533	7302.165	1334.632	2x180=360	LH	TVM - KLM	
7	C7	10000	8797.964	9040.514	242.55	2x50=100	LH	TVM - KLM	
8	C8	3000	11415.119	11815.111	399.992	2x130=260	RH	TVM - KLM	
9	C9	1850	11964.667	12690.826	726.159	2x180=360	LH	TVM - KLM	
10	C10	3000	13369.887	14110.467	740.58	2x130=260	RH	TVM - KLM	
11	C11	3000	14859.296	15242.184	382.888	2x130=260	RH	TVM - KLM	
12	C12	3000	16645.385	17624.897	979.512	2x130=260	RH	TVM - KLM	
13	C13	15000	18343.245	18740.033	396.788	2x120=240	LH	TVM - KLM	
14	C14	8000	19875.085	20398.036	522.951	2x130=260	RH	TVM - KLM	
15	C15	3000	21461.785	22416.212	954.427	2x130=260	RH	TVM - KLM	
16	C16	2250	24338.174	25103.793	765.619	2x200=400	RH	TVM - KLM	
17	C17	10000	26602.043	26953.784	351.741	2x50=100	LH	TVM - KLM	
18	C18	3000	28822.777	29755.515	932.738	2x130=260	RH	TVM - KLM	
19	C19	3000	31939.249	32763.925	824.676	2x130=260	LH	TVM - KLM	
20	C20	2250	36579.069	37959.717	1380.648	2x200=400	LH	TVM - KLM	
21	C21	3000	39192.089	40633.803	1441.714	2x130=260	LH	TVM - KLM	
22	C22	3300	43999.736	44552.936	553.2	2x130=260	RH	TVM - KLM	
23	C23	2000	45187.512	46287.719	1100.207	2x200=400	LH	TVM - KLM	
24	C24	2000	46533.486	47663.142	1129.656	2x200=400	RH	TVM - KLM	
25	C25	3000	49648.399	50382.274	733.875	2x130=260	RH	TVM - KLM	
26	C26	650	53943.441	54466.792	523.351	2x110=220	RH	TVM - KLM	Entry of Kollam Station(1)
27	C27	1000	56467.348	57303.145	835.797	2x130=260	RH	KLM - CNGR	Entry of Kollam Station(2)
28	C28	10000	58472.575	58984.358	511.783	2x120=240	LH	KLM - CNGR	

29	C29	3000	59708.632	60189.143	480.511	2x130=260	RH	KLM - CNGR	
30	C30	3000	61622.372	62709.289	1086.917	2x130=260	LH	KLM - CNGR	
31	C31	3000	63787.366	64528.649	741.283	2x130=260	RH	KLM - CNGR	
32	C32	3000	65525.159	67587.453	2062.294	2x130=260	LH	KLM - CNGR	
33	C33	3000	72958.582	74322.382	1363.8	2x130=260	RH	KLM - CNGR	
34	C34	2250	76939.603	78584.571	1644.968	2x200=400	LH	KLM - CNGR	
35	C35	3000	81057.605	81476.873	419.268	2x130=260	RH	KLM - CNGR	
36	C36	3000	85000.499	85745.144	744.645	2x130=260	LH	KLM - CNGR	
37	C37	3000	86454.194	88762.992	2308.798	2x130=260	RH	KLM - CNGR	
38	C38	8000	92013.045	92539.374	526.329	2x120=240	LH	KLM - CNGR	
39	C39	8000	92998.740	93410.532	411.792	2x120=240	LH	KLM - CNGR	
40	C40	2250	94448.160	95332.017	883.857	2x200=400	LH	KLM - CNGR	
41	C41	8000	97061.302	97695.422	634.12	2x120=240	RH	KLM - CNGR	
42	C42	4000	98592.060	100049.369	1457.309	2x130=260	RH	KLM - CNGR	
43	C43	3000	104198.353	104572.789	374.436	2x130=260	LH	CNGR - KTM	
44	C44	3000	107539.596	108786.779	1247.183	2x130=260	LH	CNGR - KTM	
45	C45	6000	109373.099	109762.497	389.398	2x130=260	RH	CNGR - KTM	
46	C46	4000	111324.827	111794.866	470.039	2x130=260	LH	CNGR - KTM	
47	C47	3000	113684.891	114311.083	626.192	2x200=400	RH	CNGR - KTM	
48	C48	3000	118132.259	119125.023	992.764	2x130=260	LH	CNGR - KTM	
49	C49	10000	120393.493	120811.660	418.167	2x120=240	LH	CNGR - KTM	
50	C50	3000	123916.304	125232.408	1316.104	2x130=260	LH	CNGR - KTM	
51	C51	3000	127140.124	128956.278	1816.154	2x130=260	RH	CNGR - KTM	
52	C52	3000	129938.161	131160.477	1222.316	2x130=260	LH	CNGR - KTM	
53	C53	3000	132662.790	134811.265	2148.475	2x130=260	RH	CNGR - KTM	
54	C54	3500	137008.678	137396.008	387.33	2x130=260	LH	KTM - EKM	
55	C55	1500	137739.202	138919.690	1180.488	2x130=260	RH	KTM - EKM	Entryof Kottayam Station(3)
56	C56	2500	143928.266	145050.504	1122.238	2x150=300	LH	KTM - EKM	
57	C57	3000	146665.349	148668.699	2003.35	2x130=260	LH	KTM - EKM	
58	C58	3000	154524.560	155077.959	553.399	2x130=260	RH	KTM - EKM	
59	C59	2250	158565.617	160204.083	1638.466	2x200=400	LH	KTM - EKM	
60	C60	3000	160958.369	162873.590	1915.221	2x130=260	RH	KTM - EKM	
61	C61	3000	165701.430	166686.927	985.497	2x130=260	LH	KTM - EKM	
62	C62	3000	168995.223	169944.505	949.282	2x130=260	RH	KTM - EKM	

63	C63	3000	174478.790	176181.299	1702.509	2x130=260	LH	KTM - EKM	
64	C64	2500	177649.094	178861.204	1212.11	2x150=300	LH	KTM - EKM	
65	C65	3000	181209.443	182805.987	1596.544	2x130=260	RH	KTM - EKM	
66	C66	2500	184159.312	185190.039	1030.727	2x150=300	LH	KTM - EKM	
67	C67	2250	185535.111	187237.983	1702.872	2x200=400	RH	KTM - EKM	
68	C68	2250	187770.520	188636.936	866.416	2x200=400	LH	KTM - EKM	
69	C69	1900	189202.333	191902.642	2700.309	2x180=360	RH	KTM - EKM	
70	C70	2250	192822.381	193453.468	631.087	2x200=400	LH	KTM - EKM	
71	C71	900	193853.983	194275.257	421.274	2x130=260	RH	KTM - EKM	Entry of ernakulam Station(4)
72	C72	2300	196197.326	197325.088	1127.762	2x160=320	LH	EKM - KOA	
73	C73	15000	198916.996	199249.502	332.506	2x100=200	RH	EKM - KOA	
74	C74	3000	200151.588	200541.242	389.654	2x130=260	LH	EKM - KOA	
75	C75	3000	204194.841	206933.807	2738.966	2x130=260	LH	EKM - KOA	
76	C76	2000	208698.370	210949.220	2250.85	2x190=380	RH	EKM - KOA	
77	C77	1850	211196.453	212143.856	947.403	2x180=360	LH	EKM - KOA	
78	C78	3000	212759.738	213319.316	559.578	2x130=260	RH	KOA - TSR	
79	C79	3000	213391.229	214283.086	891.857	2x130=260	LH	KOA - TSR	
80	C80	2250	214677.178	215677.176	999.998	2x180=360	LH	KOA - TSR	
81	C81	3000	216497.677	217724.349	1226.672	2x130=260	LH	KOA - TSR	
82	C82	5000	218123.075	218570.430	447.355	2x110=220	LH	KOA - TSR	
83	C83	13000	220286.044	220707.178	421.134	2x100=200	RH	KOA - TSR	
84	C84	3000	224517.147	226511.285	1994.138	2x130=260	RH	KOA - TSR	
85	C85	3000	229261.500	229785.613	524.113	2x130=260	RH	KOA - TSR	
86	C86	2250	233014.964	234622.137	1607.173	2x200=400	LH	KOA - TSR	
87	C87	2800	236450.961	238027.743	1576.782	2x150=300	RH	KOA - TSR	
88	C88	2500	241867.598	243146.684	1279.086	2x150=300	LH	KOA - TSR	
89	C89	5000	245562.548	245864.571	302.023	2x100=200	RH	KOA - TSR	
90	C90	3000	248474.982	251640.127	3165.145	2x130=260	RH	KOA - TSR	
91	C91	1900	255134.787	257187.580	2052.793	2x190=380	LH	KOA - TSR	
92	C92	700	257480.579	258263.982	783.403	2x110=220	RH	KOA - TSR	Entry of Thrissur Station(5)
93	C93	1000	259635.831	259927.253	291.422	2x130=260	RH	TSR - TIR	Entry of Thrissur Station(6)
94	C94	650	260027.246	260482.349	455.103	2x110=220	LH	TSR - TIR	Entry of Thrissur Station(7)
95	C95	650	260583.948	260691.284	107.336	2x40=80	LH	TSR - TIR	Entry of Thrissur Station(8)
96	C96	650	260745.024	261067.616	322.592	2x110=220	RH	TSR - TIR	Entry of Thrissur Station(9)

97	C97	2250	261864.000	262581.427	717.427	2x200=400	LH	TSR - TIR	
98	C98	3000	263339.792	265028.288	1688.496	2x130=260	LH	TSR - TIR	
99	C99	3000	266058.432	267152.225	1093.793	2x130=260	LH	TSR - TIR	
100	C100	3000	269195.291	270111.029	915.738	2x130=260	RH	TSR - TIR	
101	C101	3000	271919.281	273289.013	1369.732	2x130=260	LH	TSR - TIR	
102	C102	3000	275034.345	275810.258	775.913	2x130=260	RH	TSR - TIR	
103	C103	10000	277417.258	278035.470	618.212	2x100=200	LH	TSR - TIR	
104	C104	3000	278873.521	279719.257	845.736	2x130=260	RH	TSR - TIR	
105	C105	3000	284382.123	285287.957	905.834	2x130=260	RH	TSR - TIR	
106	C106	3000	290783.237	291569.174	785.937	2x130=260	LH	TSR - TIR	
107	C107	3000	293545.455	294884.443	1338.988	2x130=260	RH	TSR - TIR	
108	C108	3000	298623.245	299082.756	459.511	2x130=260	LH	TSR - TIR	
109	C109	3000	305339.216	305722.309	383.093	2x130=260	LH	TSR - TIR	
110	C110	2250	308060.764	310070.736	2009.972	2x200=400	LH	TSR - TIR	
111	C111	3000	310480.316	311674.849	1194.533	2x130=260	RH	TSR - TIR	
112	C112	3000	314517.860	315639.003	1121.143	2x130=260	RH	TSR - TIR	
113	C113	3000	319043.353	319375.570	332.217	2x130=260	LH	TSR - TIR	
114	C114	3000	319494.485	319824.465	329.98	2x130=260	RH	TSR - TIR	
115	C115	5000	322319.915	322612.371	292.456	2x90=180	RH	TIR - KKD	
116	C116	10000	322964.047	323400.415	436.368	2x50=100	LH	TIR - KKD	
117	C117	3000	324688.874	325948.362	1259.488	2x130=260	RH	TIR - KKD	
118	C118	10000	328660.408	328844.420	184.012	2x50=100	RH	TIR - KKD	
119	C119	10000	329414.528	329821.760	407.232	2x50=100	LH	TIR - KKD	
120	C120	3000	330371.067	331184.130	813.063	2x130=260	LH	TIR - KKD	
121	C121	2000	333239.630	334211.016	971.386	2x190=380	RH	TIR - KKD	
122	C122	3000	336513.021	337946.771	1433.75	2x130=260	LH	TIR - KKD	
123	C123	10000	341545.131	341947.757	402.626	2x50=100	LH	TIR - KKD	
124	C124	1850	342921.828	344473.820	1551.992	2x180=360	RH	TIR - KKD	
125	C125	3000	345343.855	345656.231	312.376	2x130=260	LH	TIR - KKD	
126	C126	2250	346594.607	347060.760	466.153	2x200=400	LH	TIR - KKD	
127	C127	2250	347217.986	348074.304	856.318	2x200=400	LH	TIR - KKD	
128	C128	1850	348453.804	349721.281	1267.477	2x180=360	LH	TIR - KKD	
129	C129	3000	352438.199	352819.667	381.468	2x130=260	LH	TIR - KKD	
130	C130	1850	352958.121	354421.054	1462.933	2x180=360	RH	TIR - KKD	

131	C131	5000	354660.283	355198.627	538.344	2x100=200	LH	TIR - KKD	
132	C132	1900	355479.064	356564.106	1085.042	2x190=380	LH	TIR - KKD	
133	C133	650	356880.452	357388.113	507.661	2x110=220	RH	TIR - KKD	Entry of Kozhikode Station(10)
134	C134	1000	358492.023	358803.162	311.139	2x110=220	LH	KKD - KNR	Entry of Kozhikode Station(11)
135	C135	3200	360169.895	360464.069	294.174	2x130=260	LH	KKD - KNR	
136	C136	3500	360841.291	361134.756	293.465	2x130=260	RH	KKD - KNR	
137	C137	3000	363038.485	363339.770	301.285	2x130=260	RH	KKD - KNR	
138	C138	3000	363613.916	363910.867	296.951	2x130=260	LH	KKD - KNR	
139	C139	5000	366419.771	367100.774	681.003	2x130=260	LH	KKD - KNR	
140	C140	2250	368230.369	369442.228	1211.859	2x200=400	RH	KKD - KNR	
141	C141	2250	371815.856	373043.701	1227.845	2x200=400	LH	KKD - KNR	
142	C142	2250	380679.462	381404.198	724.736	2x200=400	LH	KKD - KNR	
143	C143	1860	383971.071	384811.277	840.206	2x190=380	LH	KKD - KNR	
144	C144	2000	386388.887	387555.346	1166.459	2x190=380	LH	KKD - KNR	
145	C145	2000	388266.779	391063.167	2796.388	2x180=360	RH	KKD - KNR	
146	C146	10000	398363.621	399508.690	1145.069	2x140=280	RH	KKD - KNR	
147	C147	2500	399938.526	401438.507	1499.981	2x170=340	LH	KKD - KNR	
148	C148	1900	402969.174	403733.693	764.519	2x180=360	RH	KKD - KNR	
149	C149	8000	404512.325	404947.867	435.542	2x110=220	LH	KKD - KNR	
150	C150	1900	405936.815	407136.462	1199.647	2x190=380	RH	KKD - KNR	
151	C151	2000	407644.954	408526.783	881.829	2x190=380	LH	KKD - KNR	
152	C152	1900	410135.656	411008.305	872.649	2x190=380	LH	KKD - KNR	
153	C153	2000	414300.433	415317.784	1017.351	2x190=380	RH	KKD - KNR	
154	C154	1900	416801.862	419176.410	2374.548	2x190=380	LH	KKD - KNR	
155	C155	2000	419571.507	421149.269	1577.762	2x190=380	RH	KKD - KNR	
156	C156	2000	426554.016	427633.066	1079.05	2x190=380	LH	KKD - KNR	
157	C157	1900	428400.345	429554.760	1154.415	2x190=380	RH	KKD - KNR	
158	C158	4000	429766.449	430515.066	748.617	2x150=300	LH	KKD - KNR	
159	C159	2500	431140.215	431947.749	807.534	2x180=360	RH	KKD - KNR	
160	C160	2000	432747.632	433396.023	648.391	2x190=380	LH	KKD - KNR	
161	C161	1900	434276.887	435444.729	1167.842	2x190=380	RH	KKD - KNR	
162	C162	2300	437285.256	438956.000	1670.744	2x190=380	LH	KKD - KNR	
163	C163	3000	440668.483	441040.384	371.901	2x130=260	RH	KKD - KNR	
164	C164	2750	441585.101	444007.328	2422.227	2x140=280	LH	KKD - KNR	

165	C165	1500	444239.868	444934.170	694.302	2x180=360	LH	KKD - KNR	Entry of Kannur Station(12)
166	C166	900	445283.423	446429.118	1145.695	2x130=260	RH	KKD - KNR	Entry of Kannur Station(13)
167	C167	650	447518.706	447966.321	447.615	2x110=220	RH	KNR - KGD	Entry of Kannur Station(14)
168	C168	3000	449982.254	450317.708	335.454	2x130=260	LH	KNR - KGD	
169	C169	1850	451416.477	452237.328	820.851	2x180=360	LH	KNR - KGD	
170	C170	1900	452274.666	453953.468	1678.802	2x190=380	RH	KNR - KGD	
171	C171	2000	454835.396	456589.789	1754.393	2x180=360	LH	KNR - KGD	
172	C172	1850	462289.178	463651.879	1362.701	2x180=360	LH	KNR - KGD	
173	C173	1850	463841.710	465270.070	1428.36	2x180=360	RH	KNR - KGD	
174	C174	7500	466426.588	466745.763	319.175	2x100=200	RH	KNR - KGD	
175	C175	5000	467347.335	467650.044	302.709	2x100=200	LH	KNR - KGD	
176	C176	3000	468220.549	468631.652	411.103	2x130=260	LH	KNR - KGD	
177	C177	3000	470789.445	471428.500	639.055	2x130=260	RH	KNR - KGD	
178	C178	2000	473518.649	474783.323	1264.674	2x180=360	LH	KNR - KGD	
179	C179	2250	477457.387	479370.429	1913.042	2x200=400	RH	KNR - KGD	
180	C180	3000	482529.224	482835.662	306.438	2x130=260	LH	KNR - KGD	
181	C181	2250	484353.116	485374.847	1021.731	2x200=400	RH	KNR - KGD	
182	C182	1850	488077.565	489294.193	1216.628	2x180=360	LH	KNR - KGD	
183	C183	2250	490592.361	491877.705	1285.344	2x200=400	RH	KNR - KGD	
184	C184	3000	492867.442	493703.634	836.192	2x130=260	LH	KNR - KGD	
185	C185	3000	494180.515	494654.534	474.019	2x130=260	RH	KNR - KGD	
186	C186	1850	496617.899	497466.798	848.899	2x180=360	LH	KNR - KGD	
187	C187	1850	499349.874	500884.042	1534.168	2x180=360	LH	KNR - KGD	
188	C188	1850	501027.178	502793.059	1765.881	2x180=360	RH	KNR - KGD	
189	C189	3000	506584.966	507005.133	420.167	2x130=260	RH	KNR - KGD	
190	C190	1850	511114.699	511930.846	816.147	2x180=360	LH	KNR - KGD	
191	C191	2250	512438.121	513439.582	1001.461	2x200=400	RH	KNR - KGD	
192	C192	2000	513614.003	514258.516	644.513	2x180=360	LH	KNR - KGD	
193	C193	3000	514360.445	514854.471	494.026	2x130=260	LH	KNR - KGD	
194	C194	2250	516011.692	517029.174	1017.482	2x200=400	RH	KNR - KGD	
195	C195	2000	517765.484	518494.098	728.614	2x190=380	LH	KNR - KGD	
196	C196	2250	519079.596	520787.431	1707.835	2x200=400	RH	KNR - KGD	
197	C197	2250	521223.595	523291.777	2068.182	2x200=400	LH	KNR - KGD	
198	C198	2000	525955.849	527409.281	1453.432	2x180=360	RH	KNR - KGD	

199	C199	1000	528621.258	529417.064	795.806	2x140=280	LH	KNR - KGD	Entry of Kasaragod Station(15)
200	C200	650	529544.023	529911.354	367.331	2x110=220	RH	KNR - KGD	Entry of Kasaragod Station(16)
201	C201	650	531354.204	531797.503	443.299	2x110=220	LH	KGD - KDD	Entry of Kasaragod Station beyond Kasaragod

TABLE: ROUTE LENGTH AND PROPOSED STATION LOCATIONS ON THE SILVER LINE

Sl.No.	Station Name	Chainage in (Km)	Inter distance in (Km)	Latitude (N)	Longitude (E)
1	Dead End/Begning of Track	-1.100	0.000		
2	Thiruvananthapuram	0.000	1.100	8°30'44.94"N	76°53'50.63"E
3	Kollam	55.338	55.338	8°53'44.51"N	76°39'25.56"E
4	Chengannur	102.900	47.562	9°18'28.66"N	76°38'26.37"E
5	Kottayam	136.108	33.208	9°34'33.43"N	76°22'18.74"E
6	Ernakulam	195.329	59.221	10° 0'48.99"N	76°22'36.56"E
7	Kochi Airport	212.318	16.989	10° 9'21.98"N	76°22'51.02"E
8	Thrissur	259.117	46.799	10°30'31.32"N	76°12'19.67"E
9	Tirur	320.562	61.445	10°56'46.40"N	75°54'08.66"E
10	Kozhikode	357.868	37.306	11°14'49.70"N	75°46'46.89"E
11	Kannur	446.095	88.227	11°52'19.04"N	75°22'08.96"E
12	Kasaragod	529.450	83.355	12°29'27.51"N	74°59'13.30"E
13	Kasaragod Depot Entry chainage(End Of Main Line)	532.249	2.799		
14	Total Length Start to End (Km)		533.349		
15	Total Length Thiruvananthapuram station Center to		529.450		
	Depot Locations				
1	Kollam	55.338	0.000	8°53'03.23"N	76°38'53.47"E
2	Kasaragod	530.953	475.615	12°30'45.59"N	74°58'21.03"E
	RORO Loding/Unloading Points				
1	Thiruvananthapuram RORO(At Kazhakkoottam)	8.019	0.000	8°34'27.49"N	76°51'53.64"E
2	Kollam(Attached to station)	55.338	47.319	8°53'44.51"N	76°39'25.56"E
3	Ernakulam RORO (At Pazhanganad)	199.168	143.830	10° 2'42.63"N	76°23'25.42"E
4	Thrissur RORO(At Muriyad)	241.160	41.992	10°22'2.96"N	76°15'00.27"E
5	Kasargod RORO (At Kasaragod Depot)	531.950	290.790	12°30'33.22"N	74°58'28.92"E

Independent RORO Without Loading/Unloading Points					
1	Kozhikode RORO (At West Hill)	362.471	0.000	11°17'9.55"N	75°45'52.78"E
2	Kannur RORO(Near Kannur)	448.624	86.153	11°53'1.25"N	75°21'45.63"E
Engineering Maintanace Depot					
1	Kollam(attached to station)	55.338	0.000	8°53'44.51"N	76°39'25.56"E
2	Thrissur RORO (At Muriyad)	241.160	185.822	10°22'2.96"N	76°15'00.27"E
3	Kannur RORO(Near Kannur)	447.459	206.299	11°53'1.25"N	75°21'45.63"E
OHE Maintenance Depot					
1	Kollam	55.338	0.000	8°53'44.51"N	76°39'25.56"E
2	Ernakulam RORO (At Pazhanganad)	199.168	143.830	10° 2'42.63"N	76°23'25.42"E
3	Tirur	320.562	121.394	10°56'46.40"N	75°54'08.66"E
4	Kannur RORO(Near Kannur)	447.459	126.897	11°53'1.25"N	75°21'45.63"E
Ballast Depot Location					
1	Kollam (Attached to station)	55.338	0.000	8°53'44.51"N	76°39'25.56"E
2	Kottayam(Attached to station)	136.108	80.770	9°34'33.43"N	76°32'18.74"E
3	Thrissur RORO (At Muriyad)	241.160	105.052	10°22'2.96"N	76°15'00.27"E
4	Kozhikode RORO (At West Hill)	362.471	121.311	11°17'9.55"N	75°45'52.78"E
Brake Down Special Sidings					
1	Kollam Depot	55.338	0.000	8°53'03.23"N	76°38'53.47"E
2	Kasaragod Depot	530.953	475.615	12°30'45.59"N	74°58'21.03"E
RRV Siding Location					
1	Kollam Depot	55.338	0.000	8°53'03.23"N	76°38'53.47"E
2	Thrissur RORO(At Muriyad)	241.150	185.812	10°22'2.96"N	76°15'00.27"E
3	Kasaragod Depot	530.953	289.803	12°30'45.59"N	74°58'21.03"E

SilverLine Between Thiruvananthapuram to Kasaragod
Details of Horizontal Alignment sharp Curves

Sl No.	Curve No	Radius of Curve(m)	Chainage (M)		Curve Length (m)	Transition length (m)	LH/RH	Between Stations	Remarks
			Start	End					
1	C1	400	-831.109	-618.796	212.313	2x50=100	RH	TVA - TVM	On Shunting Neck ML
2	C26	650	53943.441	54466.792	523.351	2x110=220	RH	TVM - KLM	Entry of Kollam Station(1)
3	C27	1000	56467.348	57303.145	835.797	2x130=260	RH	KLM - CNGR	Entry of Kollam Station(2)
4	C55	1500	137739.202	138919.690	1180.488	2x130=260	RH	KTM - EKM	Entryof Kottayam Station(3)
5	C71	900	193853.983	194275.257	421.274	2x130=260	RH	KTM - EKM	Entry of ernakulam Station(4)
6	C92	700	257480.579	258263.982	783.403	2x110=220	RH	KOA - TSR	Entry of Thrissur Station(5)
7	C93	1000	259635.831	259927.253	291.422	2x130=260	RH	TSR - TIR	Entry of Thrissur Station(6)
8	C94	650	260027.246	260482.349	455.103	2x110=220	LH	TSR - TIR	Entry of Thrissur Station(7)
9	C95	650	260583.948	260691.284	107.336	2x40=80	LH	TSR - TIR	Entry of Thrissur Station(8)
10	C96	650	260745.024	261067.616	322.592	2x110=220	RH	TSR - TIR	Entry of Thrissur Station(9)
11	C133	650	356880.452	357388.113	507.661	2x110=220	RH	TIR - KKD	Entry of Kozhikode Station(10)
12	C134	1000	358492.023	358803.162	311.139	2x110=220	LH	KKD - KNR	Entry of Kozhikode Station(11)
13	C165	1500	444239.868	444934.170	694.302	2x180=360	LH	KKD - KNR	Entry of Kannur Station(12)
14	C166	900	445283.423	446429.118	1145.695	2x130=260	RH	KKD - KNR	Entry of Kannur Station(13)
15	C167	650	447518.706	447966.321	447.615	2x110=220	RH	KNR - KGD	Entry of Kannur Station(14)
16	C199	1000	528621.258	529417.064	795.806	2x140=280	LH	KNR - KGD	Entry of Kasaragod Station(15)
17	C200	650	529544.023	529911.354	367.331	2x110=220	RH	KNR - KGD	Entry of Kasaragod Station(16)
18	C201	650	531354.204	531797.503	443.299	2x110=220	LH	KGD - KDD	Entry of Kasaragod Station beyond Kasaragod

Details of Vertical Alignment on Silver Line Between Thiruvananthapuram to Kasaragod

SL No	Point Type	Start Station	Start Elevation	Start Gradient	Point Type	End Station	End Elevation	End Gradient	Element Type	Curve No.	Element Length	Between Stations	Radius
1	POB	-1+100.000	11.5	0.00%	PVC	2+041.320	11.5	0.00%	Linear		3141.320	TVA-TVM	
2	PVC	2+041.320	11.5	0.00%	PVT	2+252.876	11.28	-0.21%	Circular	VC1	211.556	TVM-KLM	100000.000
3	PVT	2+252.876	11.28	-0.21%	PVC	4+001.884	7.58	-0.21%	Linear		1749.008	TVM-KLM	
4	PVC	4+001.884	7.58	-0.21%	PVT	4+197.986	7.55	0.18%	Circular	VC2	196.102	TVM-KLM	-50000.000
5	PVT	4+197.986	7.55	0.18%	PVC	5+554.859	10	0.18%	Linear		1356.873	TVM-KLM	
6	PVC	5+554.859	10	0.18%	PVT	5+684.705	10.12	0.01%	Circular	VC3	129.846	TVM-KLM	75000.000
7	PVT	5+684.705	10.12	0.01%	PVC	8+462.559	10.33	0.01%	Linear		2777.854	TVM-KLM	
8	PVC	8+462.559	10.33	0.01%	PVT	8+561.692	10.32	-0.03%	Circular	VC4	99.133	TVM-KLM	300000.000
9	PVT	8+561.692	10.32	-0.03%	PVC	10+047.786	9.94	-0.03%	Linear		1486.095	TVM-KLM	
10	PVC	10+047.786	9.94	-0.03%	PVT	10+166.081	9.92	-0.01%	Circular	VC5	118.295	TVM-KLM	-765000.000
11	PVT	10+166.081	9.92	-0.01%	PVC	13+200.241	9.61	-0.01%	Linear		3034.159	TVM-KLM	
12	PVC	13+200.241	9.61	-0.01%	PVT	13+306.368	9.49	-0.21%	Circular	VC6	106.128	TVM-KLM	52000.000
13	PVT	13+306.368	9.49	-0.21%	PVC	14+635.054	6.65	-0.21%	Linear		1328.686	TVM-KLM	
14	PVC	14+635.054	6.65	-0.21%	PVT	14+823.857	7.23	0.83%	Circular	VC7	188.803	TVM-KLM	-18000.000
15	PVT	14+823.857	7.23	0.83%	PVC	16+980.775	25.24	0.83%	Linear		2156.918	TVM-KLM	
16	PVC	16+980.775	25.24	0.83%	PVT	17+317.435	24.9	-1.04%	Circular	VC8	336.660	TVM-KLM	18000.000
17	PVT	17+317.435	24.9	-1.04%	PVC	18+872.765	8.79	-1.04%	Linear		1555.330	TVM-KLM	
18	PVC	18+872.765	8.79	-1.04%	PVT	19+148.764	8.05	0.50%	Circular	VC9	275.998	TVM-KLM	-18000.000
19	PVT	19+148.764	8.05	0.50%	PVC	20+057.786	12.58	0.50%	Linear		909.022	TVM-KLM	
20	PVC	20+057.786	12.58	0.50%	PVT	20+185.349	12.81	-0.13%	Circular	VC10	127.564	TVM-KLM	20350.000
21	PVT	20+185.349	12.81	-0.13%	PVC	23+627.745	8.37	-0.13%	Linear		3442.396	TVM-KLM	
22	PVC	23+627.745	8.37	-0.13%	PVT	23+853.144	8.94	0.63%	Circular	VC11	225.399	TVM-KLM	-29570.000
23	PVT	23+853.144	8.94	0.63%	PVC	26+300.582	24.43	0.63%	Linear		2447.438	TVM-KLM	
24	PVC	26+300.582	24.43	0.63%	PVT	26+468.592	25.16	0.23%	Circular	VC12	168.009	TVM-KLM	41630.000
25	PVT	26+468.592	25.16	0.23%	PVC	29+014.342	31	0.23%	Linear		2545.751	TVM-KLM	
26	PVC	29+014.342	31	0.23%	PVT	29+147.313	31.39	0.35%	Circular	VC13	132.970	TVM-KLM	-112000.000
27	PVT	29+147.313	31.39	0.35%	PVC	32+254.596	42.21	0.35%	Linear		3107.283	TVM-KLM	
28	PVC	32+254.596	42.21	0.35%	PVT	32+352.202	42.67	0.60%	Circular	VC14	97.606	TVM-KLM	-39000.000

29	PVT	32+352.202	42.67	0.60%	PVC	36+852.172	69.61	0.60%	Linear		4499.971	TVM-KLM	
30	PVC	36+852.172	69.61	0.60%	PVT	37+214.422	68.13	-1.41%	Circular	VC15	362.250	TVM-KLM	18000.000
31	PVT	37+214.422	68.13	-1.41%	PVC	38+731.179	46.68	-1.41%	Linear		1516.757	TVM-KLM	
32	PVC	38+731.179	46.68	-1.41%	PVT	38+988.041	44.88	0.01%	Circular	VC16	256.862	TVM-KLM	-18000.000
33	PVT	38+988.041	44.88	0.01%	PVC	40+033.598	45.02	0.01%	Linear		1045.557	TVM-KLM	
34	PVC	40+033.598	45.02	0.01%	PVT	40+149.977	44.66	-0.63%	Circular	VC17	116.379	TVM-KLM	18000.000
35	PVT	40+149.977	44.66	-0.63%	PVC	41+642.588	35.2	-0.63%	Linear		1492.611	TVM-KLM	
36	PVC	41+642.588	35.2	-0.63%	PVT	41+786.347	34.86	0.17%	Circular	VC18	143.759	TVM-KLM	-18000.000
37	PVT	41+786.347	34.86	0.17%	PVC	45+556.629	41.09	0.17%	Linear		3770.282	TVM-KLM	
38	PVC	45+556.629	41.09	0.17%	PVT	45+811.346	39.71	-1.25%	Circular	VC19	254.717	TVM-KLM	18000.000
39	PVT	45+811.346	39.71	-1.25%	PVC	48+110.266	10.98	-1.25%	Linear		2298.919	TVM-KLM	
40	PVC	48+110.266	10.98	-1.25%	PVT	48+395.134	9.67	0.33%	Circular	VC20	284.869	TVM-KLM	-18000.000
41	PVT	48+395.134	9.67	0.33%	PVC	51+328.356	19.43	0.33%	Linear		2933.221	TVM-KLM	
42	PVC	51+328.356	19.43	0.33%	PVT	51+460.241	19.38	-0.40%	Circular	VC21	131.886	TVM-KLM	18000.000
43	PVT	51+460.241	19.38	-0.40%	PVC	53+047.941	13.03	-0.40%	Linear		1587.700	TVM-KLM	
44	PVC	53+047.941	13.03	-0.40%	PVT	53+092.831	12.84	-0.44%	Circular	VC22	44.890	TVM-KLM	125000.000
45	PVT	53+092.831	12.84	-0.44%	PVC	54+136.600	8.29	-0.44%	Linear		1043.769	TVM-KLM	
46	PVC	54+136.600	8.29	-0.44%	PVT	54+267.282	8.01	0.00%	Circular	VC23	130.683	TVM-KLM	-30000.000
47	PVT	54+267.282	8.01	0.00%	PVC	57+836.174	8	0.00%	Linear		3568.892	KLM - CNGR	
48	PVC	57+836.174	8	0.00%	PVT	58+002.159	8.34	0.41%	Circular	VC24	165.984	KLM - CNGR	-40000.000
49	PVT	58+002.159	8.34	0.41%	PVC	62+353.833	26.39	0.41%	Linear		4351.674	KLM - CNGR	
50	PVC	62+353.833	26.39	0.41%	PVT	62+478.218	26.5	-0.24%	Circular	VC25	124.385	KLM - CNGR	19000.000
51	PVT	62+478.218	26.5	-0.24%	PVC	64+062.636	22.69	-0.24%	Linear		1584.418	KLM - CNGR	
52	PVC	64+062.636	22.69	-0.24%	PVT	64+239.076	23.14	0.74%	Circular	VC26	176.440	KLM - CNGR	-18000.000
53	PVT	64+239.076	23.14	0.74%	PVC	65+676.212	33.77	0.74%	Linear		1437.136	KLM - CNGR	
54	PVC	65+676.212	33.77	0.74%	PVT	65+980.445	33.45	-0.95%	Circular	VC27	304.232	KLM - CNGR	18000.000
55	PVT	65+980.445	33.45	-0.95%	PVC	67+792.090	16.24	-0.95%	Linear		1811.646	KLM - CNGR	
56	PVC	67+792.090	16.24	-0.95%	PVT	67+978.082	15.34	-0.02%	Circular	VC28	185.991	KLM - CNGR	-20000.000
57	PVT	67+978.082	15.34	-0.02%	PVC	72+275.874	14.48	-0.02%	Linear		4297.792	KLM - CNGR	
58	PVC	72+275.874	14.48	-0.02%	PVT	72+419.870	14.97	0.70%	Circular	VC29	143.997	KLM - CNGR	-20000.000
59	PVT	72+419.870	14.97	0.70%	PVC	75+115.078	33.84	0.70%	Linear		2695.207	KLM - CNGR	
60	PVC	75+115.078	33.84	0.70%	PVT	75+224.483	34.4	0.34%	Circular	VC30	109.406	KLM - CNGR	30000.000
61	PVT	75+224.483	34.4	0.34%	PVC	76+401.202	38.35	0.34%	Linear		1176.719	KLM - CNGR	

62	PVC	76+401.202	38.35	0.34%	PVT	76+732.239	36.72	-1.32%	Circular	VC31	331.036	KLM - CNGR	20000.000
63	PVT	76+732.239	36.72	-1.32%	PVC	77+794.966	22.69	-1.32%	Linear		1062.727	KLM - CNGR	
64	PVC	77+794.966	22.69	-1.32%	PVT	78+239.025	21.76	0.90%	Circular	VC32	444.059	KLM - CNGR	-20000.000
65	PVT	78+239.025	21.76	0.90%	PVC	79+527.565	33.36	0.90%	Linear		1288.539	KLM - CNGR	
66	PVC	79+527.565	33.36	0.90%	PVT	79+887.640	33.36	-0.90%	Circular	VC33	360.075	KLM - CNGR	20000.000
67	PVT	79+887.640	33.36	-0.90%	PVC	81+669.325	17.33	-0.90%	Linear		1781.685	KLM - CNGR	
68	PVC	81+669.325	17.33	-0.90%	PVT	81+859.318	16.52	0.05%	Circular	VC34	189.993	KLM - CNGR	-20000.000
69	PVT	81+859.318	16.52	0.05%	PVC	84+712.050	17.95	0.05%	Linear		2852.732	KLM - CNGR	
70	PVC	84+712.050	17.95	0.05%	PVT	84+862.046	18.47	0.65%	Circular	VC35	149.997	KLM - CNGR	-25000.000
71	PVT	84+862.046	18.47	0.65%	PVC	86+931.666	31.93	0.65%	Linear		2069.620	KLM - CNGR	
72	PVC	86+931.666	31.93	0.65%	PVT	87+209.659	31.8	-0.74%	Circular	VC36	277.993	KLM - CNGR	20000.000
73	PVT	87+209.659	31.8	-0.74%	PVC	89+660.264	13.67	-0.74%	Linear		2450.604	KLM - CNGR	
74	PVC	89+660.264	13.67	-0.74%	PVT	89+806.259	13.12	-0.01%	Circular	VC37	145.996	KLM - CNGR	-20000.000
75	PVT	89+806.259	13.12	-0.01%	PVC	95+886.513	12.51	-0.01%	Linear		6080.254	KLM - CNGR	
76	PVC	95+886.513	12.51	-0.01%	PVT	96+135.641	14.21	1.37%	Circular	VC38	249.127	KLM - CNGR	-18000.000
77	PVT	96+135.641	14.21	1.37%	PVC	98+025.433	40.18	1.37%	Linear		1889.792	KLM - CNGR	
78	PVC	98+025.433	40.18	1.37%	PVT	98+401.215	41.42	-0.71%	Circular	VC39	375.782	KLM - CNGR	18000.000
79	PVT	98+401.215	41.42	-0.71%	PVC	101+839.776	16.88	-0.71%	Linear		3438.561	KLM - CNGR	
80	PVC	101+839.776	16.88	-0.71%	PVT	101+968.231	16.42	0.00%	Circular	VC40	128.454	KLM - CNGR	-18000.000
81	PVT	101+968.231	16.42	0.00%	PVC	103+825.392	16.42	0.00%	Linear		1857.162	CNGR - KTM	
82	PVC	103+825.392	16.42	0.00%	PVT	103+895.150	16.41	-0.05%	Circular	VC41	69.758	CNGR - KTM	150000.000
83	PVT	103+895.150	16.41	-0.05%	PVC	108+895.230	14.08	-0.05%	Linear		5000.080	CNGR - KTM	
84	PVC	108+895.230	14.08	-0.05%	PVT	108+969.924	13.99	-0.20%	Circular	VC42	74.695	CNGR - KTM	50000.000
85	PVT	108+969.924	13.99	-0.20%	PVC	110+901.931	10.21	-0.20%	Linear		1932.007	CNGR - KTM	
86	PVC	110+901.931	10.21	-0.20%	PVT	111+104.100	10.01	0.01%	Circular	VC43	202.169	CNGR - KTM	-100000.000
87	PVT	111+104.100	10.01	0.01%	PVC	112+707.814	10.11	0.01%	Linear		1603.715	CNGR - KTM	
88	PVC	112+707.814	10.11	0.01%	PVT	112+803.222	10.18	0.13%	Circular	VC44	95.408	CNGR - KTM	-77000.000
89	PVT	112+803.222	10.18	0.13%	PVC	113+901.321	11.61	0.13%	Linear		1098.099	CNGR - KTM	
90	PVC	113+901.321	11.61	0.13%	PVT	114+064.243	11.19	-0.65%	Circular	VC45	162.923	CNGR - KTM	21000.000
91	PVT	114+064.243	11.19	-0.65%	PVC	114+779.669	6.57	-0.65%	Linear		715.426	CNGR - KTM	
92	PVC	114+779.669	6.57	-0.65%	PVT	115+085.873	7.2	1.06%	Circular	VC46	306.204	CNGR - KTM	-18000.000
93	PVT	115+085.873	7.2	1.06%	PVC	116+042.623	17.3	1.06%	Linear		956.750	CNGR - KTM	
94	PVC	116+042.623	17.3	1.06%	PVT	116+173.997	18.2	0.33%	Circular	VC47	131.374	CNGR - KTM	18000.000

95	PVT	116+173.997	18.2	0.33%	PVC	117+478.967	22.45	0.33%	Linear		1304.970	CNGR - KTM	
96	PVC	117+478.967	22.45	0.33%	PVT	117+586.869	22.89	0.48%	Circular	VC48	107.902	CNGR - KTM	-70000.000
97	PVT	117+586.869	22.89	0.48%	PVC	118+639.534	27.94	0.48%	Linear		1052.665	CNGR - KTM	
98	PVC	118+639.534	27.94	0.48%	PVT	118+751.437	28.13	-0.14%	Circular	VC49	111.903	CNGR - KTM	18000.000
99	PVT	118+751.437	28.13	-0.14%	PVC	119+617.564	26.9	-0.14%	Linear		866.127	CNGR - KTM	
100	PVC	119+617.564	26.9	-0.14%	PVT	119+880.978	28.45	1.32%	Circular	VC50	263.414	CNGR - KTM	-18000.000
101	PVT	119+880.978	28.45	1.32%	PVC	120+647.365	38.58	1.32%	Linear		766.386	CNGR - KTM	
102	PVC	120+647.365	38.58	1.32%	PVT	120+926.568	40.1	-0.23%	Circular	VC51	279.204	CNGR - KTM	17500.000
103	PVT	120+926.568	40.1	-0.23%	PVC	121+866.684	37.95	-0.23%	Linear		940.115	CNGR - KTM	
104	PVC	121+866.684	37.95	-0.23%	PVT	121+999.699	37.73	-0.10%	Circular	VC52	133.016	CNGR - KTM	-25000.000
105	PVT	121+999.699	37.73	-0.10%	PVC	122+839.343	36.92	-0.10%	Linear		839.643	CNGR - KTM	
106	PVC	122+839.343	36.92	-0.10%	PVT	123+050.723	35.47	-1.27%	Circular	VC53	211.381	CNGR - KTM	18000.000
107	PVT	123+050.723	35.47	-1.27%	PVC	124+060.412	22.64	-1.27%	Linear		1009.688	CNGR - KTM	
108	PVC	124+060.412	22.64	-1.27%	PVT	124+370.428	21.37	0.45%	Circular	VC54	310.017	CNGR - KTM	-18000.000
109	PVT	124+370.428	21.37	0.45%	PVC	125+633.526	27.07	0.45%	Linear		1263.097	CNGR - KTM	
110	PVC	125+633.526	27.07	0.45%	PVT	125+976.580	25.35	-1.45%	Circular	VC55	343.055	CNGR - KTM	18000.000
111	PVT	125+976.580	25.35	-1.45%	PVC	127+501.178	3.17	-1.45%	Linear		1524.598	CNGR - KTM	
112	PVC	127+501.178	3.17	-1.45%	PVT	127+780.398	1.28	0.10%	Circular	VC56	279.220	CNGR - KTM	-18000.000
113	PVT	127+780.398	1.28	0.10%	PVC	131+928.624	5.29	0.10%	Linear		4148.225	CNGR - KTM	
114	PVC	131+928.624	5.29	0.10%	PVT	132+108.267	5.55	0.20%	Circular	VC57	179.643	CNGR - KTM	-177000.000
115	PVT	132+108.267	5.55	0.20%	PVC	134+357.448	10.01	0.20%	Linear		2249.181	CNGR - KTM	
116	PVC	134+357.448	10.01	0.20%	PVT	134+466.473	10.12	0.00%	Circular	VC58	109.025	CNGR - KTM	55000.000
117	PVT	134+466.473	10.12	0.00%	PVC	137+579.272	10.12	0.00%	Linear		3112.799	KTM - EKM	
118	PVC	137+579.272	10.12	0.00%	PVT	137+691.247	9.99	-0.22%	Circular	VC59	111.975	KTM - EKM	50000.000
119	PVT	137+691.247	9.99	-0.22%	PVC	139+133.350	6.76	-0.22%	Linear		1442.104	KTM - EKM	
120	PVC	139+133.350	6.76	-0.22%	PVT	139+306.707	6.75	0.21%	Circular	VC60	173.357	KTM - EKM	-40000.000
121	PVT	139+306.707	6.75	0.21%	PVC	140+406.102	9.05	0.21%	Linear		1099.395	KTM - EKM	
122	PVC	140+406.102	9.05	0.21%	PVT	140+501.419	9.48	0.69%	Circular	VC61	95.317	KTM - EKM	-20000.000
123	PVT	140+501.419	9.48	0.69%	PVC	142+070.470	20.25	0.69%	Linear		1569.051	KTM - EKM	
124	PVC	142+070.470	20.25	0.69%	PVT	142+241.338	20.61	-0.26%	Circular	VC62	170.869	KTM - EKM	18000.000
125	PVT	142+241.338	20.61	-0.26%	PVC	144+474.243	14.73	-0.26%	Linear		2232.904	KTM - EKM	
126	PVC	144+474.243	14.73	-0.26%	PVT	144+589.612	14.5	-0.14%	Circular	VC63	115.369	KTM - EKM	-90000.000
127	PVT	144+589.612	14.5	-0.14%	PVC	146+202.593	12.32	-0.14%	Linear		1612.981	KTM - EKM	

128	PVC	146+202.593	12.32	-0.14%	PVT	146+406.894	13.2	1.00%	Circular	VC64	204.301	KTM - EKM	-18000.000
129	PVT	146+406.894	13.2	1.00%	PVC	147+917.927	28.31	1.00%	Linear		1511.033	KTM - EKM	
130	PVC	147+917.927	28.31	1.00%	PVT	148+073.915	29.41	0.40%	Circular	VC65	155.988	KTM - EKM	26000.000
131	PVT	148+073.915	29.41	0.40%	PVC	149+058.854	33.35	0.40%	Linear		984.939	KTM - EKM	
132	PVC	149+058.854	33.35	0.40%	PVT	149+220.834	34.72	1.30%	Circular	VC66	161.981	KTM - EKM	-18000.000
133	PVT	149+220.834	34.72	1.30%	PVC	150+583.296	52.44	1.30%	Linear		1362.461	KTM - EKM	
134	PVC	150+583.296	52.44	1.30%	PVT	151+063.261	52.92	-1.10%	Circular	VC67	479.965	KTM - EKM	20000.000
135	PVT	151+063.261	52.92	-1.10%	PVC	152+372.467	38.51	-1.10%	Linear		1309.207	KTM - EKM	
136	PVC	152+372.467	38.51	-1.10%	PVT	152+554.451	37.15	-0.40%	Circular	VC68	181.984	KTM - EKM	-26000.000
137	PVT	152+554.451	37.15	-0.40%	PVC	155+294.518	26.19	-0.40%	Linear		2740.068	KTM - EKM	
138	PVC	155+294.518	26.19	-0.40%	PVT	155+569.382	27.19	1.13%	Circular	VC69	274.864	KTM - EKM	-18000.000
139	PVT	155+569.382	27.19	1.13%	PVC	156+872.689	41.88	1.13%	Linear		1303.307	KTM - EKM	
140	PVC	156+872.689	41.88	1.13%	PVT	157+350.527	41.55	-1.26%	Circular	VC70	477.838	KTM - EKM	20000.000
141	PVT	157+350.527	41.55	-1.26%	PVC	159+316.402	16.74	-1.26%	Linear		1965.875	KTM - EKM	
142	PVC	159+316.402	16.74	-1.26%	PVT	159+478.941	15.35	-0.45%	Circular	VC71	162.539	KTM - EKM	-20000.000
143	PVT	159+478.941	15.35	-0.45%	PVC	160+613.195	10.25	-0.45%	Linear		1134.254	KTM - EKM	
144	PVC	160+613.195	10.25	-0.45%	PVT	160+729.447	10.1	0.20%	Circular	VC72	116.252	KTM - EKM	-18000.000
145	PVT	160+729.447	10.1	0.20%	PVC	162+176.894	12.95	0.20%	Linear		1447.447	KTM - EKM	
146	PVC	162+176.894	12.95	0.20%	PVT	162+429.510	15.21	1.60%	Circular	VC73	252.616	KTM - EKM	-18000.000
147	PVT	162+429.510	15.21	1.60%	PVC	163+836.954	37.73	1.60%	Linear		1407.444	KTM - EKM	
148	PVC	163+836.954	37.73	1.60%	PVT	164+412.880	37.73	-1.60%	Circular	VC74	575.926	KTM - EKM	18000.000
149	PVT	164+412.880	37.73	-1.60%	PVC	166+026.017	11.92	-1.60%	Linear		1613.137	KTM - EKM	
150	PVC	166+026.017	11.92	-1.60%	PVT	166+288.554	9.64	-0.14%	Circular	VC75	262.538	KTM - EKM	-18000.000
151	PVT	166+288.554	9.64	-0.14%	PVC	168+722.468	6.2	-0.14%	Linear		2433.914	KTM - EKM	
152	PVC	168+722.468	6.2	-0.14%	PVT	168+840.733	6.34	0.37%	Circular	VC76	118.266	KTM - EKM	-23000.000
153	PVT	168+840.733	6.34	0.37%	PVC	170+023.752	10.75	0.37%	Linear		1183.019	KTM - EKM	
154	PVC	170+023.752	10.75	0.37%	PVT	170+143.495	10.9	-0.13%	Circular	VC77	119.743	KTM - EKM	24000.000
155	PVT	170+143.495	10.9	-0.13%	PVC	172+150.033	8.37	-0.13%	Linear		2006.538	KTM - EKM	
156	PVC	172+150.033	8.37	-0.13%	PVT	172+457.959	8.68	0.33%	Circular	VC78	307.927	KTM - EKM	-68000.000
157	PVT	172+457.959	8.68	0.33%	PVC	174+173.315	14.29	0.33%	Linear		1715.355	KTM - EKM	
158	PVC	174+173.315	14.29	0.33%	PVT	174+287.458	14.44	-0.05%	Circular	VC79	114.143	KTM - EKM	30000.000
159	PVT	174+287.458	14.44	-0.05%	PVC	176+984.109	12.99	-0.05%	Linear		2696.651	KTM - EKM	
160	PVC	176+984.109	12.99	-0.05%	PVT	177+209.205	12.75	-0.17%	Circular	VC80	225.097	KTM - EKM	200000.000

161	PVT	177+209.205	12.75	-0.17%	PVC	178+131.173	11.22	-0.17%	Linear		921.967	KTM - EKM	
162	PVC	178+131.173	11.22	-0.17%	PVT	178+449.048	13.49	1.60%	Circular	VC81	317.875	KTM - EKM	-18000.000
163	PVT	178+449.048	13.49	1.60%	PVC	179+847.109	35.86	1.60%	Linear		1398.061	KTM - EKM	
164	PVC	179+847.109	35.86	1.60%	PVT	180+351.057	36.87	-1.20%	Circular	VC82	503.948	KTM - EKM	18000.000
165	PVT	180+351.057	36.87	-1.20%	PVC	181+852.732	18.85	-1.20%	Linear		1501.675	KTM - EKM	
166	PVC	181+852.732	18.85	-1.20%	PVT	182+036.983	17.18	-0.62%	Circular	VC83	184.251	KTM - EKM	-31500.000
167	PVT	182+036.983	17.18	-0.62%	PVC	183+843.700	6.07	-0.62%	Linear		1806.717	KTM - EKM	
168	PVC	183+843.700	6.07	-0.62%	PVT	183+957.313	5.73	0.02%	Circular	VC84	113.613	KTM - EKM	-18000.000
169	PVT	183+957.313	5.73	0.02%	PVC	185+240.307	5.93	0.02%	Linear		1282.995	KTM - EKM	
170	PVC	185+240.307	5.93	0.02%	PVT	185+345.979	5.94	-0.01%	Circular	VC85	105.671	KTM - EKM	387500.000
171	PVT	185+345.979	5.94	-0.01%	PVC	188+850.710	5.55	-0.01%	Linear		3504.731	KTM - EKM	
172	PVC	188+850.710	5.55	-0.01%	PVT	188+983.822	6.03	0.73%	Circular	VC86	133.113	KTM - EKM	-18000.000
173	PVT	188+983.822	6.03	0.73%	PVC	189+873.101	12.5	0.73%	Linear		889.278	KTM - EKM	
174	PVC	189+873.101	12.5	0.73%	PVT	190+004.109	12.98	0.00%	Circular	VC87	131.009	KTM - EKM	18000.000
175	PVT	190+004.109	12.98	0.00%	PVC	196+695.640	13.02	0.00%	Linear		6691.531	EKM - KOA	
176	PVC	196+695.640	13.02	0.00%	PVT	196+985.222	12.19	-0.58%	Circular	VC88	289.582	EKM - KOA	50000.000
177	PVT	196+985.222	12.19	-0.58%	PVC	198+104.515	5.71	-0.58%	Linear		1119.293	EKM - KOA	
178	PVC	198+104.515	5.71	-0.58%	PVT	198+208.654	5.41	0.00%	Circular	VC89	104.139	EKM - KOA	-18000.000
179	PVT	198+208.654	5.41	0.00%	PVC	199+829.794	5.41	0.00%	Linear		1621.140	EKM - KOA	
180	PVC	199+829.794	5.41	0.00%	PVT	200+090.289	7.29	1.45%	Circular	VC90	260.495	EKM - KOA	-18000.000
181	PVT	200+090.289	7.29	1.45%	PVC	201+092.364	21.8	1.45%	Linear		1002.075	EKM - KOA	
182	PVC	201+092.364	21.8	1.45%	PVT	201+497.633	23.1	-0.80%	Circular	VC91	405.269	EKM - KOA	18000.000
183	PVT	201+497.633	23.1	-0.80%	PVC	202+426.084	15.63	-0.80%	Linear		928.451	EKM - KOA	
184	PVC	202+426.084	15.63	-0.80%	PVT	202+708.206	15.57	0.76%	Circular	VC92	282.122	EKM - KOA	-18000.000
185	PVT	202+708.206	15.57	0.76%	PVC	203+998.739	25.42	0.76%	Linear		1290.533	EKM - KOA	
186	PVC	203+998.739	25.42	0.76%	PVT	204+242.499	25.63	-0.59%	Circular	VC93	243.760	EKM - KOA	18000.000
187	PVT	204+242.499	25.63	-0.59%	PVC	205+457.392	18.45	-0.59%	Linear		1214.894	EKM - KOA	
188	PVC	205+457.392	18.45	-0.59%	PVT	205+560.622	18.11	-0.08%	Circular	VC94	103.230	EKM - KOA	-20000.000
189	PVT	205+560.622	18.11	-0.08%	PVC	209+218.201	15.36	-0.08%	Linear		3657.578	EKM - KOA	
190	PVC	209+218.201	15.36	-0.08%	PVT	209+321.034	15.18	-0.28%	Circular	VC95	102.834	EKM - KOA	50000.000
191	PVT	209+321.034	15.18	-0.28%	PVC	211+029.470	10.38	-0.28%	Linear		1708.436	EKM - KOA	
192	PVC	211+029.470	10.38	-0.28%	PVT	211+169.815	10.19	0.00%	Circular	VC96	140.345	EKM - KOA	-50000.000
193	PVT	211+169.815	10.19	0.00%	PVC	212+919.025	10.19	0.00%	Linear		1749.209	KOA - TSR	

194	PVC	212+919.025	10.19	0.00%	PVT	213+189.267	12.27	1.54%	Circular	VC97	270.242	KOA - TSR	-17500.000
195	PVT	213+189.267	12.27	1.54%	PVC	213+848.198	22.45	1.54%	Linear		658.931	KOA - TSR	
196	PVC	213+848.198	22.45	1.54%	PVT	214+118.440	24.54	0.00%	Circular	VC98	270.242	KOA - TSR	17500.000
197	PVT	214+118.440	24.54	0.00%	PVC	215+157.633	24.54	0.00%	Linear		1039.193	KOA - TSR	
198	PVC	215+157.633	24.54	0.00%	PVT	215+277.072	24.13	-0.68%	Circular	VC99	119.440	KOA - TSR	17500.000
199	PVT	215+277.072	24.13	-0.68%	PVC	216+930.986	12.84	-0.68%	Linear		1653.914	KOA - TSR	
200	PVC	216+930.986	12.84	-0.68%	PVT	217+107.918	12.5	0.30%	Circular	VC100	176.931	KOA - TSR	-18000.000
201	PVT	217+107.918	12.5	0.30%	PVC	219+728.238	20.38	0.30%	Linear		2620.320	KOA - TSR	
202	PVC	219+728.238	20.38	0.30%	PVT	219+859.915	20.66	0.12%	Circular	VC101	131.677	KOA - TSR	75000.000
203	PVT	219+859.915	20.66	0.12%	PVC	221+095.614	22.2	0.12%	Linear		1235.700	KOA - TSR	
204	PVC	221+095.614	22.2	0.12%	PVT	221+243.122	21.84	-0.61%	Circular	VC102	147.508	KOA - TSR	20000.000
205	PVT	221+243.122	21.84	-0.61%	PVC	223+150.314	10.15	-0.61%	Linear		1907.192	KOA - TSR	
206	PVC	223+150.314	10.15	-0.61%	PVT	223+322.430	9.84	0.25%	Circular	VC103	172.116	KOA - TSR	-20000.000
207	PVT	223+322.430	9.84	0.25%	PVC	225+223.616	14.55	0.25%	Linear		1901.186	KOA - TSR	
208	PVC	225+223.616	14.55	0.25%	PVT	225+374.031	14.75	0.02%	Circular	VC104	150.415	KOA - TSR	65000.000
209	PVT	225+374.031	14.75	0.02%	PVC	228+888.513	15.33	0.02%	Linear		3514.482	KOA - TSR	
210	PVC	228+888.513	15.33	0.02%	PVT	228+972.094	15.21	-0.32%	Circular	VC105	83.580	KOA - TSR	25000.000
211	PVT	228+972.094	15.21	-0.32%	PVC	230+041.043	11.81	-0.32%	Linear		1068.949	KOA - TSR	
212	PVC	230+041.043	11.81	-0.32%	PVT	230+196.769	11.92	0.46%	Circular	VC106	155.727	KOA - TSR	-20000.000
213	PVT	230+196.769	11.92	0.46%	PVC	231+210.981	16.59	0.46%	Linear		1014.212	KOA - TSR	
214	PVC	231+210.981	16.59	0.46%	PVT	231+258.086	16.75	0.20%	Circular	VC107	47.105	KOA - TSR	40000.000
215	PVT	231+258.086	16.75	0.20%	PVC	233+493.057	21.2	0.20%	Linear		2234.971	KOA - TSR	
216	PVC	233+493.057	21.2	0.20%	PVT	233+605.637	21.07	-0.43%	Circular	VC108	112.580	KOA - TSR	18000.000
217	PVT	233+605.637	21.07	-0.43%	PVC	236+973.233	6.71	-0.43%	Linear		3367.596	KOA - TSR	
218	PVC	236+973.233	6.71	-0.43%	PVT	237+079.813	6.49	0.00%	Circular	VC109	106.580	KOA - TSR	-25000.000
219	PVT	237+079.813	6.49	0.00%	PVC	242+403.332	6.49	0.00%	Linear		5323.519	KOA - TSR	
220	PVC	242+403.332	6.49	0.00%	PVT	242+487.085	6.51	0.04%	Circular	VC110	83.753	KOA - TSR	-200000.000
221	PVT	242+487.085	6.51	0.04%	PVC	245+966.197	7.96	0.04%	Linear		3479.112	KOA - TSR	
222	PVC	245+966.197	7.96	0.04%	PVT	246+117.017	8.21	0.29%	Circular	VC111	150.820	KOA - TSR	-60000.000
223	PVT	246+117.017	8.21	0.29%	PVC	247+504.478	12.28	0.29%	Linear		1387.461	KOA - TSR	
224	PVC	247+504.478	12.28	0.29%	PVT	247+624.798	12.27	-0.31%	Circular	VC112	120.321	KOA - TSR	20000.000
225	PVT	247+624.798	12.27	-0.31%	PVC	250+004.028	4.94	-0.31%	Linear		2379.229	KOA - TSR	
226	PVC	250+004.028	4.94	-0.31%	PVT	250+139.870	4.98	0.37%	Circular	VC113	135.842	KOA - TSR	-20000.000

227	PVT	250+139.870	4.98	0.37%	PVC	250+957.308	8.01	0.37%	Linear		817.438	KOA - TSR	
228	PVC	250+957.308	8.01	0.37%	PVT	251+096.092	8.85	0.83%	Circular	VC114	138.784	KOA - TSR	-30000.000
229	PVT	251+096.092	8.85	0.83%	PVC	251+750.169	14.3	0.83%	Linear		654.076	KOA - TSR	
230	PVC	251+750.169	14.3	0.83%	PVT	251+989.861	14.7	-0.50%	Circular	VC115	239.692	KOA - TSR	18000.000
231	PVT	251+989.861	14.7	-0.50%	PVC	253+505.135	7.15	-0.50%	Linear		1515.274	KOA - TSR	
232	PVC	253+505.135	7.15	-0.50%	PVT	253+604.767	6.9	0.00%	Circular	VC116	99.632	KOA - TSR	-20000.000
233	PVT	253+604.767	6.9	0.00%	PVC	255+865.233	6.9	0.00%	Linear		2260.466	KOA - TSR	
234	PVC	255+865.233	6.9	0.00%	PVT	256+058.861	7.95	1.08%	Circular	VC117	193.628	KOA - TSR	-18000.000
235	PVT	256+058.861	7.95	1.08%	PVC	257+774.679	26.4	1.08%	Linear		1715.819	KOA - TSR	
236	PVC	257+774.679	26.4	1.08%	PVT	257+968.307	27.45	0.00%	Circular	VC118	193.628	KOA - TSR	18000.000
237	PVT	257+968.307	27.45	0.00%	PVC	260+196.097	27.45	0.00%	Linear		2227.790	TSR - TIR	
238	PVC	260+196.097	27.45	0.00%	PVT	260+300.985	27.38	-0.13%	Circular	VC119	104.888	TSR - TIR	80000.000
239	PVT	260+300.985	27.38	-0.13%	PVC	262+174.200	24.92	-0.13%	Linear		1873.215	TSR - TIR	
240	PVC	262+174.200	24.92	-0.13%	PVT	262+320.862	24.13	-0.95%	Circular	VC120	146.663	TSR - TIR	18000.000
241	PVT	262+320.862	24.13	-0.95%	PVC	263+904.605	9.15	-0.95%	Linear		1583.743	TSR - TIR	
242	PVC	263+904.605	9.15	-0.95%	PVT	264+172.155	8.61	0.54%	Circular	VC121	267.550	TSR - TIR	-18000.000
243	PVT	264+172.155	8.61	0.54%	PVC	265+448.365	15.51	0.54%	Linear		1276.210	TSR - TIR	
244	PVC	265+448.365	15.51	0.54%	PVT	265+580.522	15.73	-0.19%	Circular	VC122	132.157	TSR - TIR	18000.000
245	PVT	265+580.522	15.73	-0.19%	PVC	267+808.080	11.42	-0.19%	Linear		2227.558	TSR - TIR	
246	PVC	267+808.080	11.42	-0.19%	PVT	267+904.941	11.33	0.00%	Circular	VC123	96.860	TSR - TIR	-50000.000
247	PVT	267+904.941	11.33	0.00%	PVC	270+330.496	11.33	0.00%	Linear		2425.555	TSR - TIR	
248	PVC	270+330.496	11.33	0.00%	PVT	270+459.955	11.71	0.59%	Circular	VC124	129.459	TSR - TIR	-22000.000
249	PVT	270+459.955	11.71	0.59%	PVC	271+455.313	17.56	0.59%	Linear		995.358	TSR - TIR	
250	PVC	271+455.313	17.56	0.59%	PVT	271+573.004	17.91	0.00%	Circular	VC125	117.690	TSR - TIR	20000.000
251	PVT	271+573.004	17.91	0.00%	PVC	273+404.509	17.91	0.00%	Linear		1831.505	TSR - TIR	
252	PVC	273+404.509	17.91	0.00%	PVT	273+511.505	18.1	0.36%	Circular	VC126	106.997	TSR - TIR	-30000.000
253	PVT	273+511.505	18.1	0.36%	PVC	275+915.465	26.67	0.36%	Linear		2403.959	TSR - TIR	
254	PVC	275+915.465	26.67	0.36%	PVT	276+218.532	25.2	-1.33%	Circular	VC127	303.067	TSR - TIR	18000.000
255	PVT	276+218.532	25.2	-1.33%	PVC	277+128.472	13.13	-1.33%	Linear		909.940	TSR - TIR	
256	PVC	277+128.472	13.13	-1.33%	PVT	277+338.017	11.6	-0.13%	Circular	VC128	209.546	TSR - TIR	-17500.000
257	PVT	277+338.017	11.6	-0.13%	PVC	279+206.108	9.18	-0.13%	Linear		1868.091	TSR - TIR	
258	PVC	279+206.108	9.18	-0.13%	PVT	279+326.313	9.12	0.03%	Circular	VC129	120.205	TSR - TIR	-75000.000
259	PVT	279+326.313	9.12	0.03%	PVC	281+912.951	9.91	0.03%	Linear		2586.639	TSR - TIR	

260	PVC	281+912.951	9.91	0.03%	PVT	282+081.737	9.73	-0.25%	Circular	VC130	168.786	TSR - TIR	60000.000
261	PVT	282+081.737	9.73	-0.25%	PVC	283+318.316	6.63	-0.25%	Linear		1236.580	TSR - TIR	
262	PVC	283+318.316	6.63	-0.25%	PVT	283+511.753	7.18	0.82%	Circular	VC131	193.437	TSR - TIR	-18000.000
263	PVT	283+511.753	7.18	0.82%	PVC	284+662.228	16.66	0.82%	Linear		1150.475	TSR - TIR	
264	PVC	284+662.228	16.66	0.82%	PVT	284+937.601	16.82	-0.71%	Circular	VC132	275.373	TSR - TIR	18000.000
265	PVT	284+937.601	16.82	-0.71%	PVC	286+122.533	8.46	-0.71%	Linear		1184.932	TSR - TIR	
266	PVC	286+122.533	8.46	-0.71%	PVT	286+289.292	8.05	0.22%	Circular	VC133	166.758	TSR - TIR	-18000.000
267	PVT	286+289.292	8.05	0.22%	PVC	287+355.497	10.41	0.22%	Linear		1066.205	TSR - TIR	
268	PVC	287+355.497	10.41	0.22%	PVT	287+487.828	10.55	0.00%	Circular	VC134	132.331	TSR - TIR	60000.000
269	PVT	287+487.828	10.55	0.00%	PVC	288+705.579	10.55	0.00%	Linear		1217.751	TSR - TIR	
270	PVC	288+705.579	10.55	0.00%	PVT	288+813.978	10.43	-0.22%	Circular	VC135	108.399	TSR - TIR	50000.000
271	PVT	288+813.978	10.43	-0.22%	PVC	291+098.981	5.48	-0.22%	Linear		2285.003	TSR - TIR	
272	PVC	291+098.981	5.48	-0.22%	PVT	291+250.739	5.32	0.00%	Circular	VC136	151.758	TSR - TIR	-70000.000
273	PVT	291+250.739	5.32	0.00%	PVC	292+186.623	5.32	0.00%	Linear		935.884	TSR - TIR	
274	PVC	292+186.623	5.32	0.00%	PVT	292+395.291	6.4	1.04%	Circular	VC137	208.668	TSR - TIR	-20000.000
275	PVT	292+395.291	6.4	1.04%	PVC	293+113.065	13.89	1.04%	Linear		717.774	TSR - TIR	
276	PVC	293+113.065	13.89	1.04%	PVT	293+405.516	14.57	-0.58%	Circular	VC138	292.450	TSR - TIR	18000.000
277	PVT	293+405.516	14.57	-0.58%	PVC	294+414.104	8.71	-0.58%	Linear		1008.588	TSR - TIR	
278	PVC	294+414.104	8.71	-0.58%	PVT	294+540.747	8.37	0.05%	Circular	VC139	126.644	TSR - TIR	-20000.000
279	PVT	294+540.747	8.37	0.05%	PVC	296+844.414	9.56	0.05%	Linear		2303.667	TSR - TIR	
280	PVC	296+844.414	9.56	0.05%	PVT	296+948.064	9.59	0.00%	Circular	VC140	103.650	TSR - TIR	200000.000
281	PVT	296+948.064	9.59	0.00%	PVC	300+874.084	9.59	0.00%	Linear		3926.020	TSR - TIR	
282	PVC	300+874.084	9.59	0.00%	PVT	300+985.160	9.67	0.15%	Circular	VC141	111.075	TSR - TIR	-75000.000
283	PVT	300+985.160	9.67	0.15%	PVC	304+730.293	15.22	0.15%	Linear		3745.134	TSR - TIR	
284	PVC	304+730.293	15.22	0.15%	PVT	304+834.600	15.25	-0.08%	Circular	VC142	104.307	TSR - TIR	45000.000
285	PVT	304+834.600	15.25	-0.08%	PVC	306+308.033	14.02	-0.08%	Linear		1473.433	TSR - TIR	
286	PVC	306+308.033	14.02	-0.08%	PVT	306+454.346	14.04	0.11%	Circular	VC143	146.313	TSR - TIR	-75000.000
287	PVT	306+454.346	14.04	0.11%	PVC	307+791.683	15.53	0.11%	Linear		1337.337	TSR - TIR	
288	PVC	307+791.683	15.53	0.11%	PVT	307+903.295	15.34	-0.45%	Circular	VC144	111.612	TSR - TIR	20000.000
289	PVT	307+903.295	15.34	-0.45%	PVC	309+500.914	8.21	-0.45%	Linear		1597.619	TSR - TIR	
290	PVC	309+500.914	8.21	-0.45%	PVT	309+608.889	8.02	0.09%	Circular	VC145	107.974	TSR - TIR	-20000.000
291	PVT	309+608.889	8.02	0.09%	PVC	310+876.406	9.2	0.09%	Linear		1267.517	TSR - TIR	
292	PVC	310+876.406	9.2	0.09%	PVT	310+984.617	9.2	-0.09%	Circular	VC146	108.212	TSR - TIR	60000.000

293	PVT	310+984.617	9.2	-0.09%	PVC	315+046.912	5.66	-0.09%	Linear		4062.295	TSR - TIR	
294	PVC	315+046.912	5.66	-0.09%	PVT	315+157.545	5.62	0.01%	Circular	VC147	110.632	TSR - TIR	-110000.000
295	PVT	315+157.545	5.62	0.01%	PVC	316+893.742	5.85	0.01%	Linear		1736.197	TSR - TIR	
296	PVC	316+893.742	5.85	0.01%	PVT	317+090.283	6.09	0.23%	Circular	VC148	196.541	TSR - TIR	-90000.000
297	PVT	317+090.283	6.09	0.23%	PVC	318+830.154	10.13	0.23%	Linear		1739.871	TSR - TIR	
298	PVC	318+830.154	10.13	0.23%	PVT	318+969.239	10.29	0.00%	Circular	VC149	139.085	TSR - TIR	60000.000
299	PVT	318+969.239	10.29	0.00%	PVC	322+707.120	10.29	0.00%	Linear		3737.881	TIR - KKD	
300	PVC	322+707.120	10.29	0.00%	PVT	322+817.707	10.23	-0.10%	Circular	VC150	110.588	TIR - KKD	110000.000
301	PVT	322+817.707	10.23	-0.10%	PVC	325+361.396	7.68	-0.10%	Linear		2543.689	TIR - KKD	
302	PVC	325+361.396	7.68	-0.10%	PVT	325+508.532	7.66	0.08%	Circular	VC151	147.136	TIR - KKD	-80000.000
303	PVT	325+508.532	7.66	0.08%	PVC	327+690.072	9.48	0.08%	Linear		2181.540	TIR - KKD	
304	PVC	327+690.072	9.48	0.08%	PVT	327+817.332	9.51	-0.04%	Circular	VC152	127.260	TIR - KKD	100000.000
305	PVT	327+817.332	9.51	-0.04%	PVC	329+071.774	8.96	-0.04%	Linear		1254.443	TIR - KKD	
306	PVC	329+071.774	8.96	-0.04%	PVT	329+171.254	9.01	0.16%	Circular	VC153	99.480	TIR - KKD	-50000.000
307	PVT	329+171.254	9.01	0.16%	PVC	331+256.008	12.25	0.16%	Linear		2084.754	TIR - KKD	
308	PVC	331+256.008	12.25	0.16%	PVT	331+361.644	12.29	-0.08%	Circular	VC154	105.636	TIR - KKD	45000.000
309	PVT	331+361.644	12.29	-0.08%	PVC	339+547.139	5.77	-0.08%	Linear		8185.496	TIR - KKD	
310	PVC	339+547.139	5.77	-0.08%	PVT	339+694.512	5.71	0.00%	Circular	VC155	147.373	TIR - KKD	-185000.000
311	PVT	339+694.512	5.71	0.00%	PVC	343+166.069	5.71	0.00%	Linear		3471.558	TIR - KKD	
312	PVC	343+166.069	5.71	0.00%	PVT	343+287.561	5.56	-0.24%	Circular	VC156	121.492	TIR - KKD	50000.000
313	PVT	343+287.561	5.56	-0.24%	PVC	344+652.527	2.24	-0.24%	Linear		1364.966	TIR - KKD	
314	PVC	344+652.527	2.24	-0.24%	PVT	344+743.197	2.19	0.12%	Circular	VC157	90.670	TIR - KKD	-25000.000
315	PVT	344+743.197	2.19	0.12%	PVC	348+210.891	6.34	0.12%	Linear		3467.694	TIR - KKD	
316	PVC	348+210.891	6.34	0.12%	PVT	348+315.646	6.35	-0.09%	Circular	VC158	104.755	TIR - KKD	50000.000
317	PVT	348+315.646	6.35	-0.09%	PVC	350+526.071	4.37	-0.09%	Linear		2210.426	TIR - KKD	
318	PVC	350+526.071	4.37	-0.09%	PVT	350+660.309	4.43	0.18%	Circular	VC159	134.237	TIR - KKD	-50000.000
319	PVT	350+660.309	4.43	0.18%	PVC	353+437.803	9.39	0.18%	Linear		2777.495	TIR - KKD	
320	PVC	353+437.803	9.39	0.18%	PVT	353+754.034	7.18	-1.58%	Circular	VC160	316.231	TIR - KKD	18000.000
321	PVT	353+754.034	7.18	-1.58%	PVC	355+893.616	-26.59	-1.58%	Linear		2139.582	TIR - KKD	
322	PVC	355+893.616	-26.59	-1.58%	PVT	356+177.688	-28.84	0.00%	Circular	VC161	284.072	TIR - KKD	-18000.000
323	PVT	356+177.688	-28.84	0.00%	PVC	358+962.055	-28.84	0.00%	Linear		2784.367	KKD - KNR	
324	PVC	358+962.055	-28.84	0.00%	PVT	359+238.314	-26.72	1.53%	Circular	VC162	276.260	KKD - KNR	-18000.000
325	PVT	359+238.314	-26.72	1.53%	PVC	361+361.878	5.88	1.53%	Linear		2123.564	KKD - KNR	

326	PVC	361+361.878	5.88	1.53%	PVT	361+638.138	8	0.00%	Circular	VC163	276.260	KKD - KNR	18000.000
327	PVT	361+638.138	8	0.00%	PVC	364+215.341	8	0.00%	Linear		2577.203	KKD - KNR	
328	PVC	364+215.341	8	0.00%	PVT	364+348.048	8.25	0.38%	Circular	VC164	132.707	KKD - KNR	-35000.000
329	PVT	364+348.048	8.25	0.38%	PVC	365+334.030	11.99	0.38%	Linear		985.982	KKD - KNR	
330	PVC	365+334.030	11.99	0.38%	PVT	365+473.621	11.98	-0.40%	Circular	VC165	139.591	KKD - KNR	18000.000
331	PVT	365+473.621	11.98	-0.40%	PVC	366+615.443	7.45	-0.40%	Linear		1141.822	KKD - KNR	
332	PVC	366+615.443	7.45	-0.40%	PVT	366+816.366	7.81	0.75%	Circular	VC166	200.923	KKD - KNR	-17500.000
333	PVT	366+816.366	7.81	0.75%	PVC	367+581.386	13.56	0.75%	Linear		765.020	KKD - KNR	
334	PVC	367+581.386	13.56	0.75%	PVT	367+727.839	14.07	-0.06%	Circular	VC167	146.453	KKD - KNR	18000.000
335	PVT	367+727.839	14.07	-0.06%	PVC	372+097.609	11.36	-0.06%	Linear		4369.770	KKD - KNR	
336	PVC	372+097.609	11.36	-0.06%	PVT	372+197.657	11.02	-0.62%	Circular	VC168	100.048	KKD - KNR	18000.000
337	PVT	372+197.657	11.02	-0.62%	PVC	373+323.296	4.07	-0.62%	Linear		1125.639	KKD - KNR	
338	PVC	373+323.296	4.07	-0.62%	PVT	373+430.985	3.73	-0.02%	Circular	VC169	107.690	KKD - KNR	-18000.000
339	PVT	373+430.985	3.73	-0.02%	PVC	374+507.697	3.52	-0.02%	Linear		1076.711	KKD - KNR	
340	PVC	374+507.697	3.52	-0.02%	PVT	374+607.974	3.74	0.46%	Circular	VC170	100.277	KKD - KNR	-21000.000
341	PVT	374+607.974	3.74	0.46%	PVC	375+609.713	8.33	0.46%	Linear		1001.739	KKD - KNR	
342	PVC	375+609.713	8.33	0.46%	PVT	375+801.432	8.19	-0.61%	Circular	VC171	191.720	KKD - KNR	18000.000
343	PVT	375+801.432	8.19	-0.61%	PVC	376+531.363	3.76	-0.61%	Linear		729.931	KKD - KNR	
344	PVC	376+531.363	3.76	-0.61%	PVT	376+643.930	3.42	0.02%	Circular	VC172	112.567	KKD - KNR	-18000.000
345	PVT	376+643.930	3.42	0.02%	PVC	377+372.665	3.56	0.02%	Linear		728.735	KKD - KNR	
346	PVC	377+372.665	3.56	0.02%	PVT	377+481.718	3.78	0.38%	Circular	VC173	109.053	KKD - KNR	-30000.000
347	PVT	377+481.718	3.78	0.38%	PVC	378+136.655	6.28	0.38%	Linear		654.937	KKD - KNR	
348	PVC	378+136.655	6.28	0.38%	PVT	378+254.942	6.57	0.12%	Circular	VC174	118.287	KKD - KNR	45000.000
349	PVT	378+254.942	6.57	0.12%	PVC	379+613.721	8.19	0.12%	Linear		1358.780	KKD - KNR	
350	PVC	379+613.721	8.19	0.12%	PVT	379+714.143	8.29	0.07%	Circular	VC175	100.421	KKD - KNR	220000.000
351	PVT	379+714.143	8.29	0.07%	PVC	380+990.814	9.23	0.07%	Linear		1276.671	KKD - KNR	
352	PVC	380+990.814	9.23	0.07%	PVT	381+102.993	9.26	-0.01%	Circular	VC176	112.179	KKD - KNR	140000.000
353	PVT	381+102.993	9.26	-0.01%	PVC	382+314.126	9.18	-0.01%	Linear		1211.134	KKD - KNR	
354	PVC	382+314.126	9.18	-0.01%	PVT	382+440.833	9.04	-0.22%	Circular	VC177	126.707	KKD - KNR	60000.000
355	PVT	382+440.833	9.04	-0.22%	PVC	383+000	18.43	-0.22%	Linear		560.000	KKD - KNR	
356	PVT	383+000	18.43	0.060%	PVT	385+026	19.63	0.060%	Linear		2026.295	KKD - KNR	
357	PVC	385+026	19.63	0.060%	PVC	385+142	19.67	0.002%	Circular	VC178	115.810	KKD - KNR	200000.000
358	PVT	385+142	19.67	0.002%	PVT	389+451	19.74	0.002%	Linear		4310.430	KKD - KNR	

359	PVC	389+451	19.74	0.002%	PVC	389+608	19.54	-0.31%	Circular	VC179	156.420	KKD - KNR	50000.000
360	PVT	389+608	19.54	-0.31%	PVT	392+600	10.22	-0.31%	Linear		2992.210	KKD - KNR	
361	PVC	392+600	10.22	-0.31%	PVC	392+745	10.04	0.05%	Circular	VC180	144.480	KKD - KNR	40000.000
362	PVT	392+745	10.04	0.05%	PVT	397+943	12.64	0.05%	Linear		5198.850	KKD - KNR	
363	PVC	397+943	12.64	0.05%	PVC	398+069	12.67	0.00%	Circular	VC181	126.000	KKD - KNR	250000.000
364	PVT	398+069	12.67	0.00%	PVT	400+426	12.67	0.00%	Linear		2356.120	KKD - KNR	
365	PVC	400+426	12.67	0.00%	PVC	400+538	12.63	-0.112%	Circular	VC182	112.300	KKD - KNR	100000.000
366	PVT	400+538	12.63	-0.112%	PVT	401+668	11.3	-0.112%	Linear		1130.310	KKD - KNR	
367	PVC	401+668	11.3	-0.112%	PVC	401+837	11.25	0.000%	Circular	VC183	168.440	KKD - KNR	150000.000
368	PVT	401+837	11.25	0.00%	PVT	402+614	11.25	0.000%	Linear		777.830	KKD - KNR	
369	PVC	402+614	11.25	0.00%	PVC	402+796	12.2	1.013%	Circular	VC184	182.310	KKD - KNR	18000.000
370	PVT	402+796	12.2	1.013%	PVT	404+154	25.35	1.013%	Linear		1358.060	KKD - KNR	
371	PVC	404+154	25.35	1.013%	PVC	404+337	26.82	0.00%	Circular	VC185	182.370	KKD - KNR	18000.000
372	PVT	404+337	26.82	0.00%	PVT	406+633	26.87	0.00%	Linear		2296.010	KKD - KNR	
373	PVC	406+633	26.87	0.00%	PVC	406+756	27.01	0.274%	Circular	VC186	123.320	KKD - KNR	45000.000
374	PVT	406+756	27.01	0.274%	PVT	407+928	30.18	0.274%	Linear		1172.250	KKD - KNR	
375	PVC	407+928	30.18	0.274%	PVC	408+177	28.92	-1.109%	Circular	VC187	248.940	KKD - KNR	18000.000
376	PVT	408+177	28.92	-1.109%	PVT	408+926	20.93	-1.109%	Linear		748.400	KKD - KNR	
377	PVC	408+926	20.93	-1.109%	PVC	409+118	19.78	-0.039%	Circular	VC188	192.070	KKD - KNR	18000.000
378	PVT	409+118	19.78	-0.039%	PVT	412+582	18.44	-0.039%	Linear		3463.780	KKD - KNR	
379	PVC	412+582	18.44	-0.039%	PVC	412+718	18.32	-0.107%	Circular	VC189	135.920	KKD - KNR	200000.000
380	PVT	412+718	18.32	-0.107%	PVT	416+256	14.56	-0.107%	Linear		3537.730	KKD - KNR	
381	PVC	416+256	14.56	-0.107%	PVC	416+362	14.50	0.00%	Circular	VC190	106.750	KKD - KNR	100000.000
382	PVT	416+362	14.50	0.00%	PVT	417+837	14.50	0.00%	Linear		1474.970	KKD - KNR	
383	PVC	417+837	14.50	0.00%	PVC	417+963	14.82	0.419%	Circular	VC191	125.740	KKD - KNR	30000.000
384	PVT	417+963	14.82	0.419%	PVT	420+260	24.43	0.419%	Linear		2297.150	KKD - KNR	
385	PVC	420+260	24.43	0.419%	PVC	420+386	24.65	0.00%	Circular	VC192	125.740	KKD - KNR	30000.000
386	PVT	420+386	24.65	0.00%	PVT	424+757	24.64	0.00%	Linear		4371.330	KKD - KNR	
387	PVC	424+757	24.64	0.00%	PVC	424+950	24.52	-0.643%	Circular	VC193	192.830	KKD - KNR	30000.000
388	PVT	424+950	24.52	-0.643%	PVT	426+148	16.36	-0.643%	Linear		1197.690	KKD - KNR	
389	PVC	426+148	16.36	-0.643%	PVC	426+271	16.00	0.040%	Circular	VC194	122.910	KKD - KNR	18000.000
390	PVT	426+271	16.00	0.040%	PVT	429+649	17.32	0.040%	Linear		3378.580	KKD - KNR	
391	PVC	429+649	17.32	0.040%	PVC	429+750	17.33	0.000%	Circular	VC195	100.210	KKD - KNR	250000.000

392	PVT	429+750	17.33	0.000%	PVT	431+472	17.32	0.000%	Linear		1722.570	KKD - KNR	
393	PVC	431+472	17.32	0.000%	PVC	431+800	16.94	-0.637%	Circular	VC196	127.380	KKD - KNR	20000.000
394	PVT	431+800	16.94	-0.637%	PVT	432+490	11.20	-0.637%	Linear		889.950	KKD - KNR	
395	PVC	432+490	11.20	-0.637%	PVC	432+610	10.87	-0.035%	Circular	VC197	120.310	KKD - KNR	20000.000
396	PVT	432+610	10.87	-0.035%	PVT	433+835	10.45	-0.035%	Linear		1225.520	KKD - KNR	
397	PVC	433+835	10.45	-0.035%	PVC	433+981	10.81	0.451%	Circular	VC198	146.030	KKD - KNR	30000.000
398	PVT	433+981	10.81	0.451%	PVT	435+572	18.02	0.451%	Linear		1590.400	KKD - KNR	
399	PVC	435+572	18.02	0.451%	PVC	435+693	18.16	-0.035%	Circular	VC199	121.680	KKD - KNR	25000.000
400	PVT	435+693	18.16	-0.035%	PVT	443+351	18.14	-0.035%	Linear		7658.000	KKD - KNR	
401	PVC	443+351	18.14	-0.035%	PVT	443+543	17.52	-0.64%	Circular	VC200	191.546	KKD - KNR	30000.000
402	PVT	444+543	17.52	-0.64%	PVC	444+604	10.75	-0.64%	Linear		1060.770	KKD - KNR	
403	PVC	444+604	10.75	-0.64%	PVT	444+859	9.94	0.00%	Circular	VC201	255.394	KKD - KNR	-40000.000
404	PVT	444+859	9.94	0.00%	PVC	448+458	9.94	0.00%	Linear		3599.366	KNR - KGD	
405	PVC	448+458	9.94	0.00%	PVT	448+766	11.12	0.77%	Circular	VC202	307.435	KNR - KGD	-40000.000
406	PVT	448+766	11.12	0.77%	PVC	449+826	19.26	0.77%	Linear		1060.088	KNR - KGD	
407	PVC	449+826	19.26	0.77%	PVT	450+065	19.51	-0.56%	Circular	VC203	239.534	KNR - KGD	18000.000
408	PVT	450+065	19.51	-0.56%	PVC	452+175	7.65	-0.56%	Linear		2110.115	KNR - KGD	
409	PVC	452+175	7.65	-0.56%	PVT	452+331	7.12	-0.12%	Circular	VC204	155.573	KNR - KGD	-35000.000
410	PVT	452+331	7.12	-0.12%	PVC	454+114	5.02	-0.12%	Linear		1782.480	KNR - KGD	
411	PVC	454+114	5.02	-0.12%	PVT	454+273	4.91	-0.02%	Circular	VC205	159.510	KNR - KGD	-170000.000
412	PVT	454+273	4.91	-0.02%	PVC	466+401	2.02	-0.02%	Linear		12127.621	KNR - KGD	
413	PVC	466+401	2.02	-0.02%	PVT	466+507	2.1	0.17%	Circular	VC206	105.952	KNR - KGD	-55000.000
414	PVT	466+507	2.1	0.17%	PVC	469+848	7.74	0.17%	Linear		3341.063	KNR - KGD	
415	PVC	469+848	7.74	0.17%	PVT	470+004	7.7	-0.22%	Circular	VC207	155.880	KNR - KGD	40000.000
416	PVT	470+004	7.7	-0.22%	PVC	472+182	2.88	-0.22%	Linear		2178.524	KNR - KGD	
417	PVC	472+182	2.88	-0.22%	PVT	472+314	2.81	0.11%	Circular	VC208	132.343	KNR - KGD	-40000.000
418	PVT	472+314	2.81	0.11%	PVC	474+221	4.91	0.11%	Linear		1906.319	KNR - KGD	
419	PVC	474+221	4.91	0.11%	PVT	474+355	4.8	-0.27%	Circular	VC209	134.459	KNR - KGD	35000.000
420	PVT	474+355	4.8	-0.27%	PVC	475+699	1.11	-0.27%	Linear		1343.588	KNR - KGD	
421	PVC	475+699	1.11	-0.27%	PVT	475+830	0.97	0.05%	Circular	VC210	131.544	KNR - KGD	-40000.000
422	PVT	475+830	0.97	0.05%	PVC	477+746	2.02	0.05%	Linear		1916.452	KNR - KGD	
423	PVC	477+747	2.02	0.05%	PVT	477+857	2.18	0.24%	Circular	VC211	110.413	KNR - KGD	-60000.000
424	PVT	477+857	2.18	0.24%	PVC	479+006	4.92	0.24%	Linear		1149.057	KNR - KGD	

425	PVC	479+006	4.92	0.24%	PVT	479+114	5.05	0.00%	Circular	VC212	107.404	KNR - KGD	45000.000
426	PVT	479+114	5.05	0.00%	PVC	480+014	5.05	0.00%	Linear		900.086	KNR - KGD	
427	PVC	480+014	5.05	0.00%	PVT	480+108	5.07	0.05%	Circular	VC213	94.250	KNR - KGD	-200000.000
428	PVT	480+108	5.07	0.05%	PVC	481+854	5.89	0.05%	Linear		1746.216	KNR - KGD	
429	PVC	481+854	5.89	0.05%	PVT	481+971	5.86	-0.10%	Circular	VC214	116.702	KNR - KGD	80000.000
430	PVT	481+971	5.86	-0.10%	PVC	482+861	4.98	-0.10%	Linear		890.109	KNR - KGD	
431	PVC	482+861	4.98	-0.10%	PVT	482+980	4.98	0.09%	Circular	VC215	119.456	KNR - KGD	-65000.000
432	PVT	482+980	4.98	0.09%	PVC	484+431	6.21	0.09%	Linear		1450.371	KNR - KGD	
433	PVC	484+431	6.21	0.09%	PVT	484+533	6.26	0.02%	Circular	VC216	102.346	KNR - KGD	150000.000
434	PVT	484+533	6.26	0.02%	PVC	486+093	6.52	0.02%	Linear		1560.117	KNR - KGD	
435	PVC	486+093	6.52	0.02%	PVT	486+263	6.41	-0.15%	Circular	VC217	170.044	KNR - KGD	100000.000
436	PVT	486+263	6.41	-0.15%	PVC	489+182	1.93	-0.15%	Linear		2918.366	KNR - KGD	
437	PVC	489+182	1.93	-0.15%	PVT	489+288	2.06	0.38%	Circular	VC218	106.693	KNR - KGD	-20000.000
438	PVT	489+288	2.06	0.38%	PVC	490+826	7.9	0.38%	Linear		1537.268	KNR - KGD	
439	PVC	490+826	7.9	0.38%	PVT	490+950	7.94	-0.31%	Circular	VC219	124.539	KNR - KGD	18000.000
440	PVT	490+950	7.94	-0.31%	PVC	491+948	4.83	-0.31%	Linear		997.418	KNR - KGD	
441	PVC	491+848	4.83	-0.31%	PVT	492+075	4.6	-0.06%	Circular	VC220	127.122	KNR - KGD	-50000.000
442	PVT	492+075	4.6	-0.06%	PVC	494+118	3.43	-0.06%	Linear		2043.339	KNR - KGD	
443	PVC	494+118	3.43	-0.06%	PVT	494+226	3.45	0.11%	Circular	VC221	108.104	KNR - KGD	-65000.000
444	PVT	494+226	3.45	0.11%	PVC	495+826	5.2	0.11%	Linear		1600.682	KNR - KGD	
445	PVC	495+827	5.2	0.11%	PVT	495+951	5.59	0.52%	Circular	VC222	124.494	KNR - KGD	-30000.000
446	PVT	495+951	5.59	0.52%	PVC	497+023	11.21	0.52%	Linear		1071.874	KNR - KGD	
447	PVC	497+023	11.21	0.52%	PVT	497+132	11.45	-0.08%	Circular	VC223	108.349	KNR - KGD	18000.000
448	PVT	497+132	11.45	-0.08%	PVC	497+798	10.93	-0.08%	Linear		666.351	KNR - KGD	
449	PVC	497+798	10.93	-0.08%	PVT	497+908	10.79	-0.17%	Circular	VC224	109.576	KNR - KGD	120000.000
450	PVT	497+908	10.79	-0.17%	PVC	500+766	5.95	-0.17%	Linear		2858.568	KNR - KGD	
451	PVC	500+766	5.95	-0.17%	PVT	500+926	5.81	-0.01%	Circular	VC225	160.340	KNR - KGD	-100000.000
452	PVT	500+926	5.81	-0.01%	PVC	511+000	4.9	-0.01%	Linear		10074.007	KNR - KGD	
453	PVC	511+000	4.9	-0.01%	PVT	511+121	4.83	-0.11%	Circular	VC226	120.272	KNR - KGD	120000.000
454	PVT	511+121	4.83	-0.11%	PVC	512+695	3.1	-0.11%	Linear		1574.701	KNR - KGD	
455	PVC	512+695	3.1	-0.11%	PVT	512+813	3.07	0.06%	Circular	VC227	117.498	KNR - KGD	-70000.000
456	PVT	512+813	3.07	0.06%	PVC	516+861	5.45	0.06%	Linear		4047.893	KNR - KGD	
457	PVC	516+861	5.45	0.06%	PVT	516+994	5.82	0.50%	Circular	VC228	133.025	KNR - KGD	-30000.000

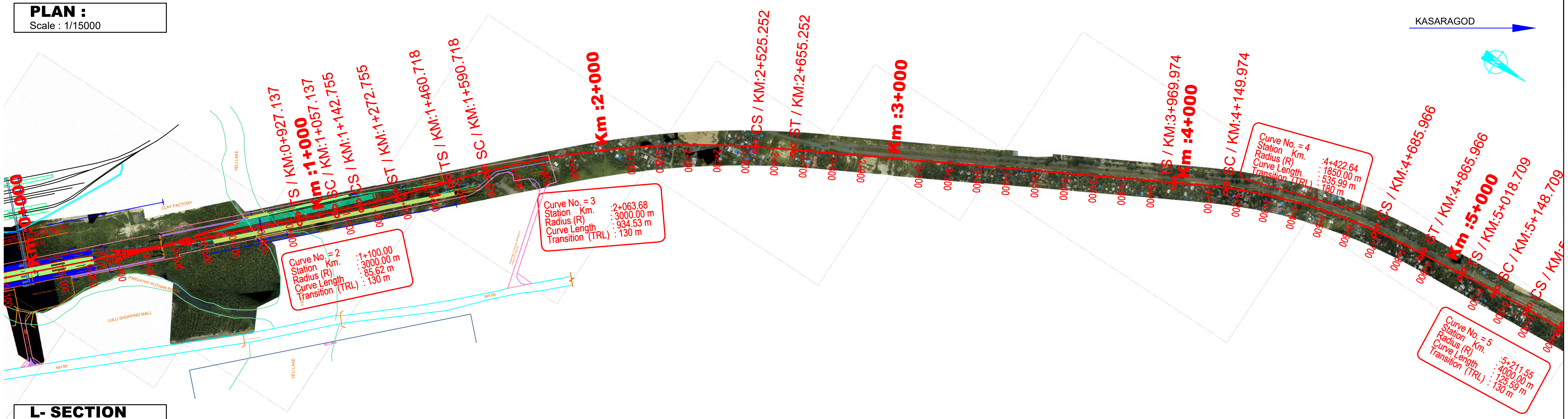
458	PVT	516+994	5.82	0.50%	PVC	518+117	11.46	0.50%	Linear		1122.875	KNR - KGD	
459	PVC	518+122	11.46	0.50%	PVT	518+233	11.79	0.07%	Circular	VC229	116.201	KNR - KGD	27000.000
460	PVT	518+233	11.79	0.07%	PVC	519+745	12.87	0.07%	Linear		1511.836	KNR - KGD	
461	PVC	519+745	12.87	0.07%	PVT	519+886	12.82	-0.14%	Circular	VC230	140.793	KNR - KGD	65000.000
462	PVT	519+886	12.82	-0.14%	PVC	522+901	8.45	-0.14%	Linear		3015.072	KNR - KGD	
463	PVC	522+901	8.45	-0.14%	PVT	523+021	8.66	0.49%	Circular	VC231	120.426	KNR - KGD	-19000.000
464	PVT	523+021	8.66	0.49%	PVC	525+263	19.61	0.49%	Linear		2241.561	KNR - KGD	
465	PVC	525+263	19.61	0.49%	PVT	525+579	18.38	-1.27%	Circular	VC232	316.000	KNR - KGD	18000.000
466	PVT	525+579	18.38	-1.27%	PVC	526+433	7.56	-1.27%	Linear		854.710	KNR - KGD	
467	PVC	526+433	7.56	-1.27%	PVT	526+695	6.15	0.19%	Circular	VC233	262.006	KNR - KGD	-18000.000
468	PVT	526+695	6.15	0.19%	PVC	528+506	9.57	0.19%	Linear		1811.142	KNR - KGD	
469	PVC	528+506	9.57	0.19%	PVT	528+617	9.67	0.00%	Circular	VC234	110.187	KNR - KGD	60000.000
470	PVT	528+617	9.67	0.00%	PVC	529+900	9.74	0.00%	Linear		1283.399	KGD - KDD	
471	PVC	529+900	9.74	0.00%	PVT	530+042	9.58	-0.23%	Circular	VC235	141.792	KGD - KDD	60000.000
472	PVT	530+420	9.58	-0.23%	POE	531+296	6.68	-0.23%	Linear		1253.923	KGD - KDD	

THIRUVANANTHAPURAM ← → KASARAGOD

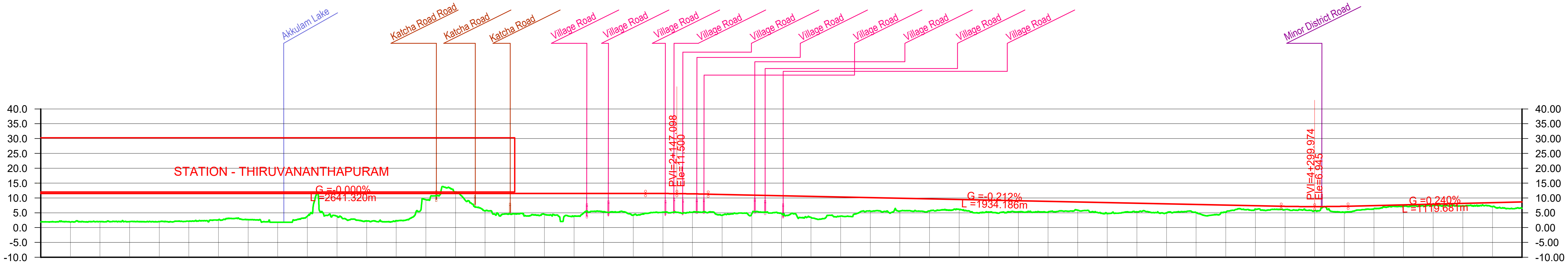
PLAN :
Scale : 1/15000

LEGEND :-

- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: L =1545.93m; Lt =130m; R =-3000.00m, Lc =85.62m; Lt =130m; L =187.96m; Lt =130m; R =3000.00m, Lc =934.53m; Lt =130m; L =1314.72m; Lt =180m; R =1850.00m, Lc =535.99m; Lt =180m; L =152.74m

VERTICAL ALIGNMENT: L =2641.32m, Gr=-0.000%; PVC2+041.32; Lvc =211.56m, R=100000; PVT2+252.88; L =1934.19m, Gr=-0.212%; PVC4+187.06; Lvc =225.82m, R=-50000; PVT4+412.89; L =1119.68m, Gr=0.240%

CHAINAGE IN KM	GROUND LEVEL	PROPOSED FORMATION	FILLING HEIGHT	CUTTING DEPTH
0+000	1.939	11.500	9.561	
0+100	1.878	11.500	9.622	
0+200	2.013	11.500	9.487	
0+300	1.983	11.500	9.517	
0+400	2.030	11.500	9.470	
0+500	2.127	11.500	9.373	
0+600	2.587	11.500	8.913	
0+700	2.655	11.500	8.845	
0+800	1.809	11.500	9.691	
0+900	3.839	11.500	7.661	
1+000	3.842	11.500	7.658	
1+100	2.246	11.500	9.254	
1+200	2.336	11.500	9.164	
1+300	9.402	11.500	2.098	
1+400	12.012	11.500		-0.512
1+500	5.634	11.500	5.866	
1+600	4.647	11.500	6.853	
1+700	4.477	11.500	7.023	
1+800	3.862	11.500	7.638	
1+900	5.360	11.500	6.140	
2+000	4.152	11.500	7.348	
2+100	5.196	11.483	6.287	
2+200	5.171	11.374	6.203	
2+300	4.166	11.177	7.011	
2+400	4.631	10.965	6.334	
2+500	4.764	10.753	5.989	
2+600	3.436	10.542	7.106	
2+700	3.862	10.330	6.468	
2+800	5.539	10.119	4.580	
2+900	5.557	9.907	4.350	
3+000	5.582	9.696	4.114	
3+100	6.169	9.484	3.315	
3+200	5.182	9.273	4.091	
3+300	5.330	9.061	3.731	
3+400	5.196	8.849	3.653	
3+500	5.860	8.638	2.778	
3+600	4.701	8.426	3.725	
3+700	5.339	8.215	2.876	
3+800	5.001	8.003	3.002	
3+900	4.954	7.792	2.838	
4+000	5.201	7.580	2.379	
4+100	6.227	7.369	1.142	
4+200	6.041	7.159	1.118	
4+300	5.765	7.073	1.308	
4+400	5.198	7.187	1.989	
4+500	6.306	7.426	1.120	
4+600	7.197	7.666	0.469	
4+700	7.456	7.906	0.450	
4+800	7.352	8.146	0.794	
4+900	7.069	8.386	1.317	
5+000	6.515	8.626	2.111	

Client : K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title: **SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD**

Drawing Name: HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No: SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0002

General Consultant : SYSTRA

Drawing Scale : Horizontal Scale : 1 : 15000 (H); Vertical Scale : 1 : 1500 (V)

Sheet No : 2 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

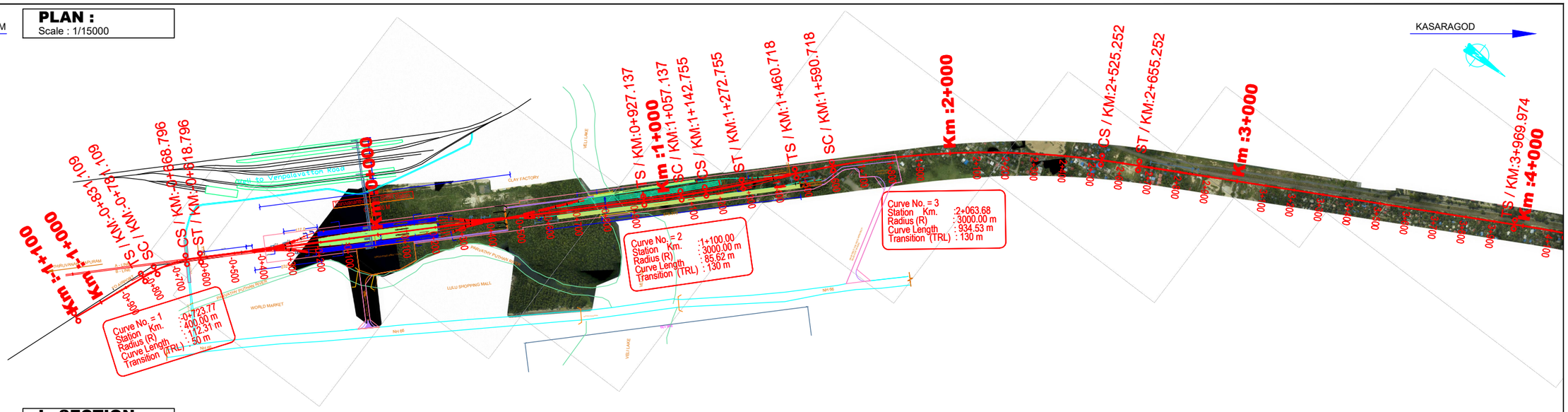
THIRUVANANTHAPURAM

PLAN :
Scale : 1/15000

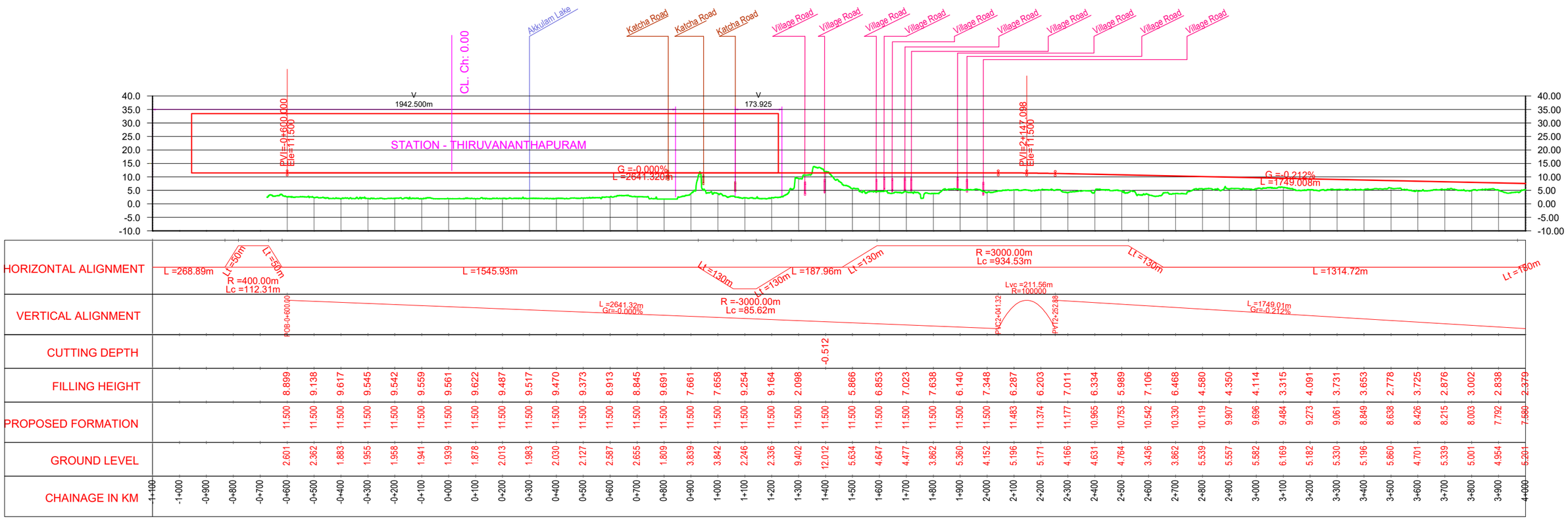
KASARAGOD

LEGEND :-

- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



Client :	Project Title:	Drawing Name:	General Consultant :	Drawing Scale :
K-rail Address: K-Rail Development Corporation Ltd 5th Floor,Trans Towers, Vazhuthacaud,Thiruvananthapuram,Kerala-695014	**SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD**	HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM Drawing No: SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0001	SYSTRA	Horizontal Scale : 1 : 15000 (H) Vertical Scale : 1 : 1500 (V) Sheet No : 1 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

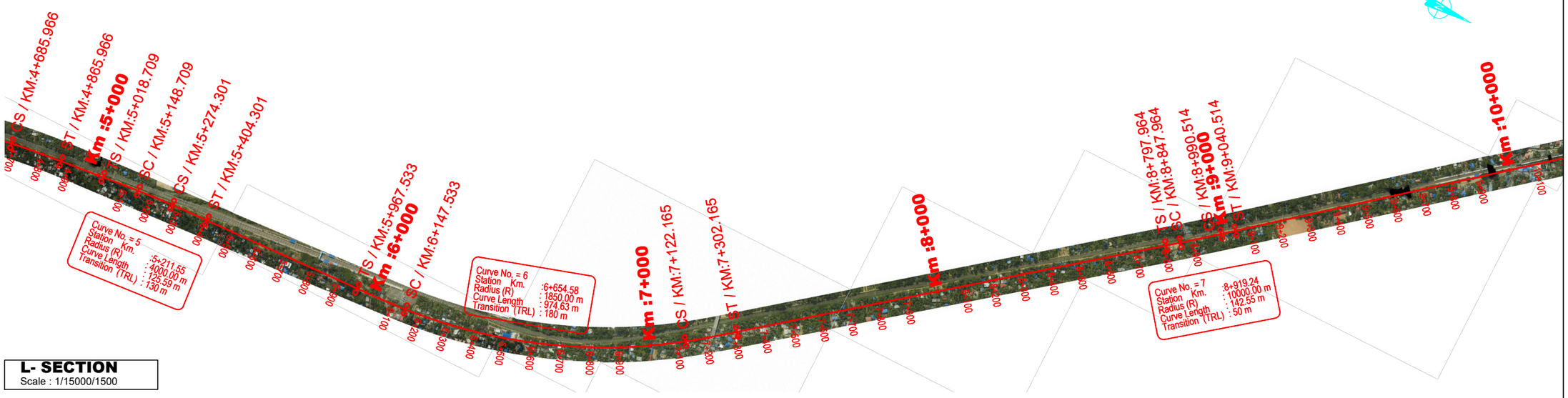
THIRUVANANTHAPURAM

KASARAGOD

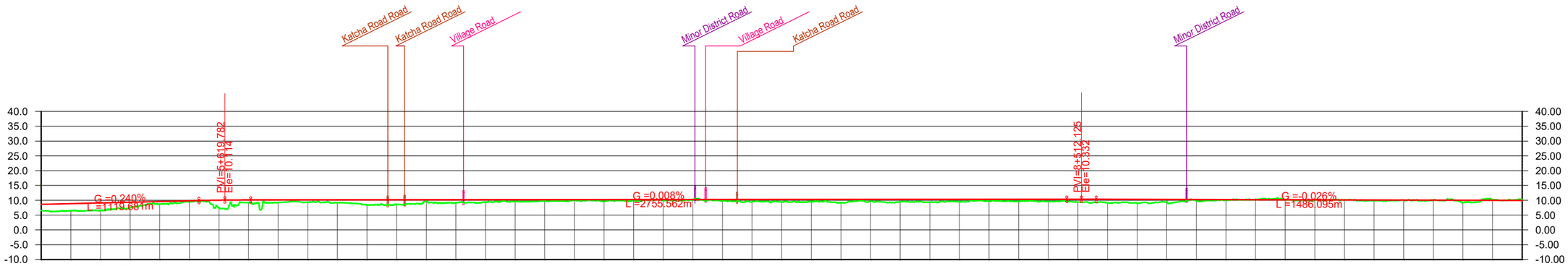
PLAN :
Scale : 1/15000

LEGEND :-

- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: L =152.74m; Lt =130m; R =4000.00m, Lc =125.59m; Lt =130m; L =563.23m; Lt =180m; R =-1850.00m, Lc =974.63m; Lt =180m; L =1495.80m; Lt =50m; R =-10000.00m, Lc =142.55m; Lt =50m; L =2374.60m

VERTICAL ALIGNMENT: L =1119.68m, Gr=0.240%; PVC5+532.57; Lvc =174.43m, R=25000.00m; PVT5+707.003; L =2755.56m, Gr=0.008%; PVC8+462.55; Lvc =99.13m, R=36000.00m; PVT8+561.693; L =1486.09m, Gr=-0.026%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
5+000		2.111	8.626	6.515
5+100		2.465	8.866	6.401
5+200		2.494	9.106	6.612
5+300		1.780	9.346	7.566
5+400		0.869	9.587	8.718
5+500		0.362	9.827	9.465
5+600		2.659	10.036	7.377
5+700		0.961	10.120	9.159
5+800		0.911	10.128	9.217
5+900		0.830	10.135	9.305
6+000		0.993	10.143	9.150
6+100		1.772	10.150	8.378
6+200		1.637	10.158	8.521
6+300		0.318	10.165	9.847
6+400		1.006	10.173	9.167
6+500		0.745	10.180	9.435
6+600		0.581	10.188	9.607
6+700		0.445	10.195	9.750
6+800		0.156	10.203	10.047
6+900		0.634	10.210	9.576
7+000		0.054	10.218	10.164
7+100		0.183	10.226	10.043
7+200		0.207	10.233	10.026
7+300		0.507	10.241	9.734
7+400		0.729	10.248	9.519
7+500		0.841	10.256	9.415
7+600		0.752	10.263	9.511
7+700		1.146	10.271	9.125
7+800		0.621	10.278	9.657
7+900		0.793	10.286	9.493
8+000		0.936	10.293	9.357
8+100		0.798	10.301	9.503
8+200		0.615	10.308	9.693
8+300		0.711	10.316	9.605
8+400		0.705	10.323	9.618
8+500		0.937	10.328	9.391
8+600		1.163	10.309	9.146
8+700		1.347	10.284	8.937
8+800		0.717	10.258	9.541
8+900		0.452	10.233	9.781
9+000		0.158	10.207	10.049
9+100	-0.119		10.182	10.301
9+200	-0.054		10.156	10.210
9+300		0.039	10.131	10.092
9+400	-0.030		10.105	10.135
9+500		0.173	10.080	9.907
9+600		0.019	10.054	10.035
9+700	-0.147		10.028	10.175
9+800		0.779	10.003	9.224
9+900	-0.165		9.977	10.142
10+000	-0.337		9.952	10.289

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0003

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 3 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

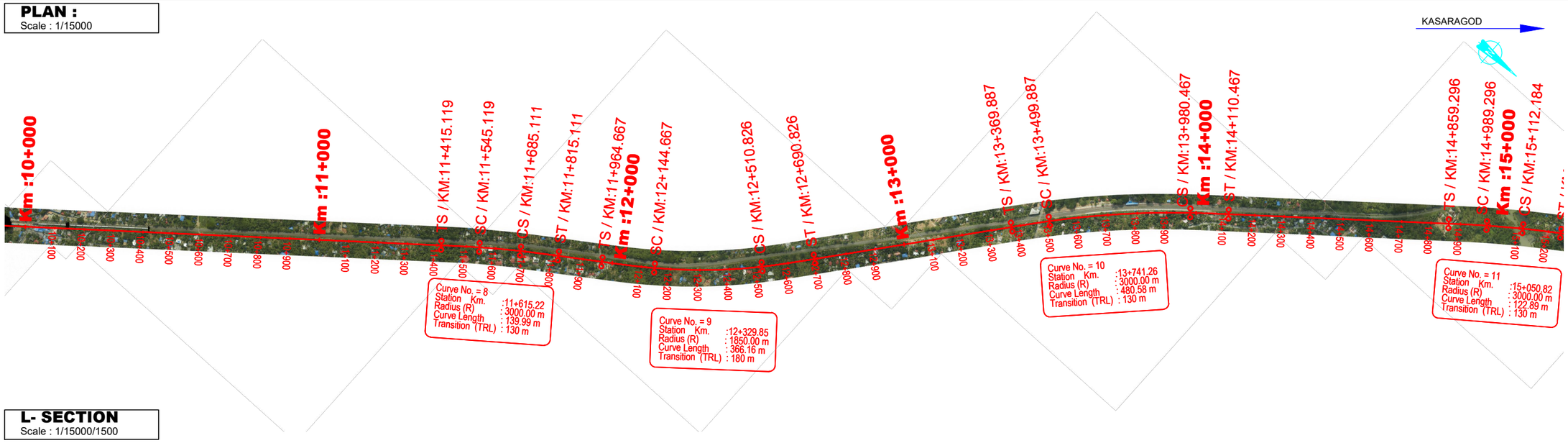
THIRUVANANTHAPURAM

KASARAGOD

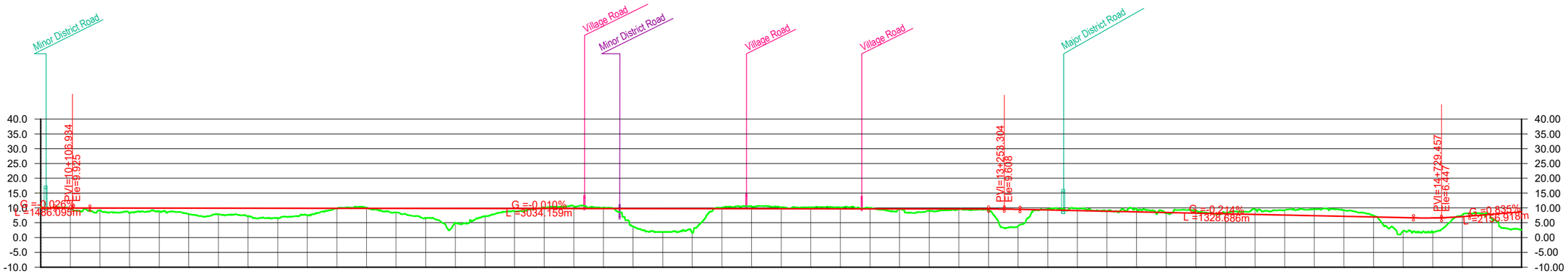
LEGEND :-

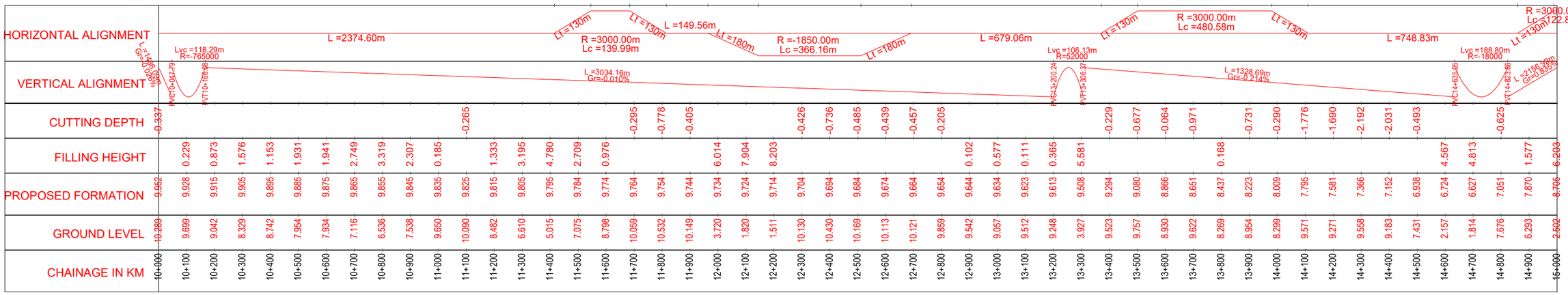
C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE

PLAN :
Scale : 1/15000



L- SECTION
Scale : 1/15000/1500





CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
10+000	0.337		9.962	10.280
10+100		0.229	9.928	9.699
10+200		0.873	9.915	9.042
10+300		1.576	9.905	8.329
10+400		1.153	9.895	8.742
10+500		1.931	9.885	7.954
10+600		1.941	9.875	7.934
10+700		2.749	9.865	7.116
10+800		3.319	9.855	6.536
10+900		2.307	9.845	7.538
11+000		0.185	9.835	9.650
11+100	-0.265		9.825	10.090
11+200		1.333	9.815	8.482
11+300		3.195	9.805	6.610
11+400		4.780	9.795	5.015
11+500		2.709	9.784	7.075
11+600		0.976	9.774	8.798
11+700	-0.295		9.764	10.059
11+800	-0.778		9.754	10.532
11+900	-0.405		9.744	10.149
12+000		6.014	9.734	3.720
12+100		7.904	9.724	1.820
12+200		8.203	9.714	1.511
12+300	-0.426		9.704	10.130
12+400	-0.736		9.694	10.430
12+500	-0.485		9.684	10.169
12+600	-0.439		9.674	10.113
12+700	-0.457		9.664	10.121
12+800	-0.205		9.654	9.859
12+900		0.102	9.644	9.542
13+000		0.577	9.634	9.057
13+100		0.111	9.623	9.512
13+200		0.365	9.613	9.248
13+300		5.581	9.508	3.927
13+400	-0.229		9.294	9.523
13+500	-0.677		9.080	9.757
13+600	-0.064		8.866	8.930
13+700	-0.971		8.651	9.622
13+800		0.168	8.437	8.269
13+900	-0.731		8.223	8.954
14+000	-0.290		8.009	8.299
14+100	-1.776		7.795	9.571
14+200	-1.690		7.581	9.271
14+300	-2.192		7.366	9.558
14+400	-2.031		7.152	9.183
14+500	-0.493		6.938	7.431
14+600		4.567	6.724	2.157
14+700		4.813	6.627	1.814
14+800	-0.625		7.051	7.676
14+900		1.577	7.870	6.293
15+000		6.203	8.705	2.502

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0004

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 4 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

THIRUVANANTHAPURAM

KASARAGOD

LEGEND :-

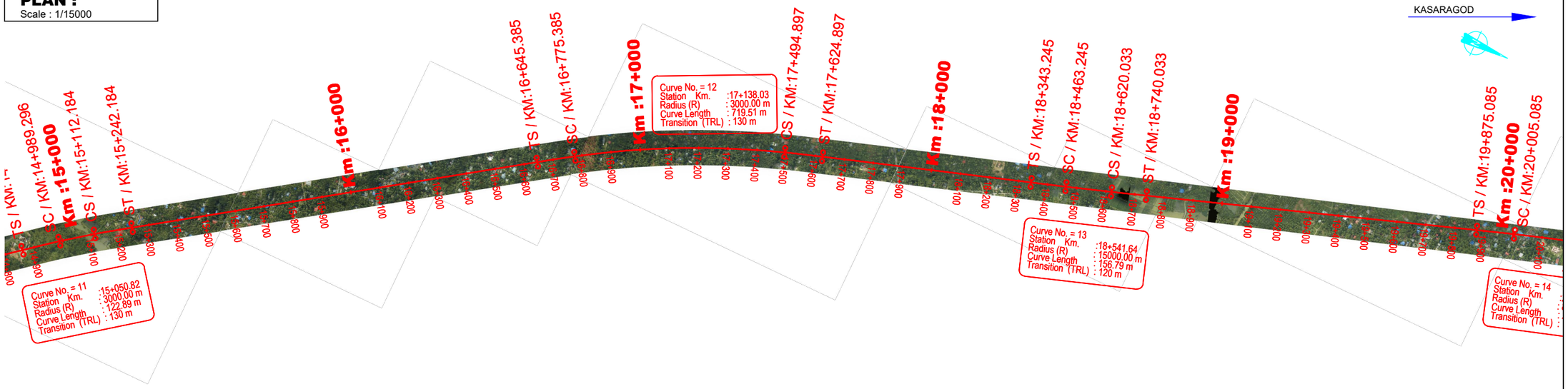
C & C - CUT & COVER

T - TUNNEL

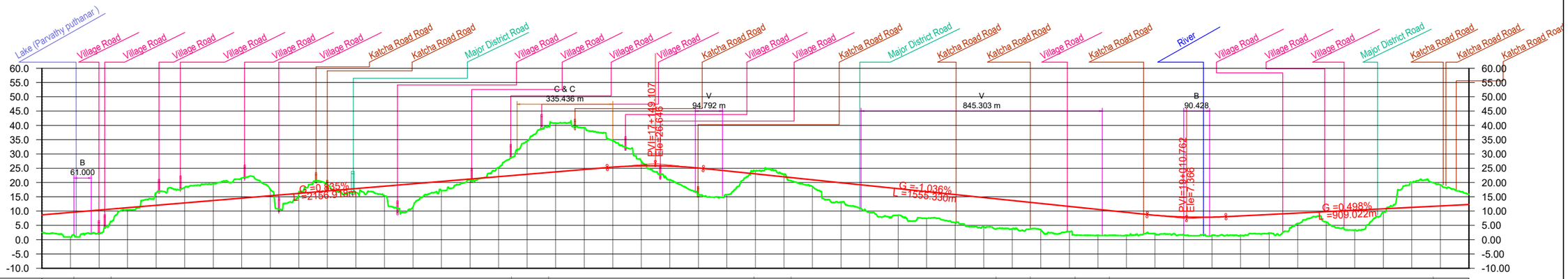
V - VIADUCT

B - RIVER BRIDGE

PLAN :
Scale : 1/15000



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: R =3000.00m Lc =122.89m; LT =130m; L =1403.20m; LT =130m; R =3000.00m Lc =719.51m; LT =130m; L =718.35m; LT =120m; R =-15000.00m Lc =156.79m; LT =120m; L =1135.05m; LT =130m

VERTICAL ALIGNMENT: L =2156.92m Gr=0.835%; PVC16+980.77; Lvc =336.66m R=18000; PVT17+317.44; L =1555.33m Gr=-1.036%; PVC18+687.77; Lvc =276.00m R=-18000; PVT19+148.76; L =909.02m Gr=0.498%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
15+000		6.203	8.706	2.502
15+100		8.586	9.540	0.954
15+200		8.241	10.375	2.134
15+300		0.720	11.210	10.490
15+400	-4.336		12.044	16.380
15+500	-5.380		12.879	18.259
15+600	-5.830		13.714	19.544
15+700	-7.055		14.549	21.604
15+800	-2.185		15.383	17.568
15+900	-0.370		16.218	16.588
16+000	-2.110		17.053	19.163
16+100		1.367	17.888	16.521
16+200		3.362	18.723	15.361
16+300		8.083	19.557	11.474
16+400		3.328	20.392	17.064
16+500		0.283	21.227	20.944
16+600	-3.140		22.062	25.202
16+700	-11.558		22.897	34.455
16+800	-17.139		23.731	40.870
16+900	-14.581		24.566	39.147
17+000	-9.282		25.391	34.673
17+100	-1.507		25.841	27.348
17+200		4.713	25.735	21.022
17+300		9.510	25.074	15.564
17+400		8.347	24.047	15.700
17+500	-0.987		23.012	23.999
17+600	-0.931		21.976	22.907
17+700		2.327	20.940	18.613
17+800		6.663	19.905	13.242
17+900		9.329	18.869	9.540
18+000		9.260	17.833	8.573
18+100		9.373	16.798	7.425
18+200		9.774	15.762	5.988
18+300		10.254	14.726	4.472
18+400		9.962	13.691	3.729
18+500		9.139	12.655	3.516
18+600		8.789	11.620	2.831
18+700		9.103	10.584	1.481
18+800		7.940	9.548	1.608
18+900		6.473	8.533	2.060
19+000		6.295	7.927	1.632
19+100		6.287	7.876	1.589
19+200		6.660	8.307	1.647
19+300		6.586	8.805	2.219
19+400		3.584	9.303	5.719
19+500		3.597	9.801	6.204
19+600		6.858	10.298	3.440
19+700		1.290	10.796	9.506
19+800	-8.805		11.294	20.099
19+900	-7.437		11.792	19.229
20+000	-3.683		12.289	15.972

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0005

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 5 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

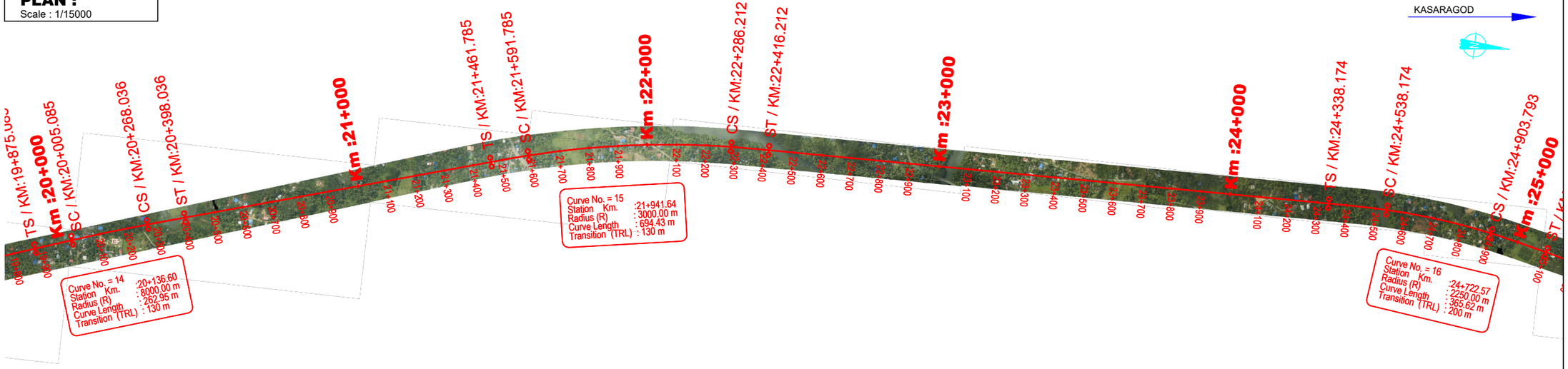
THIRUVANANTHAPURAM

KASARAGOD

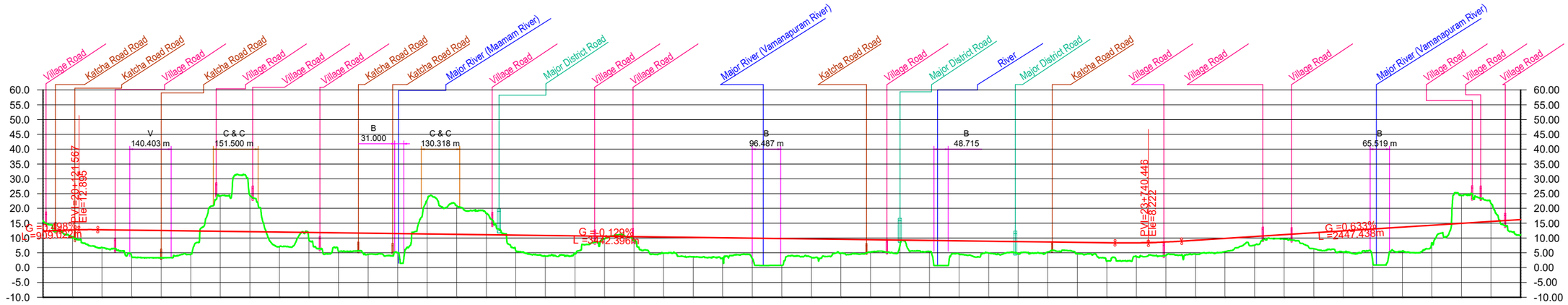
PLAN :
Scale : 1/15000

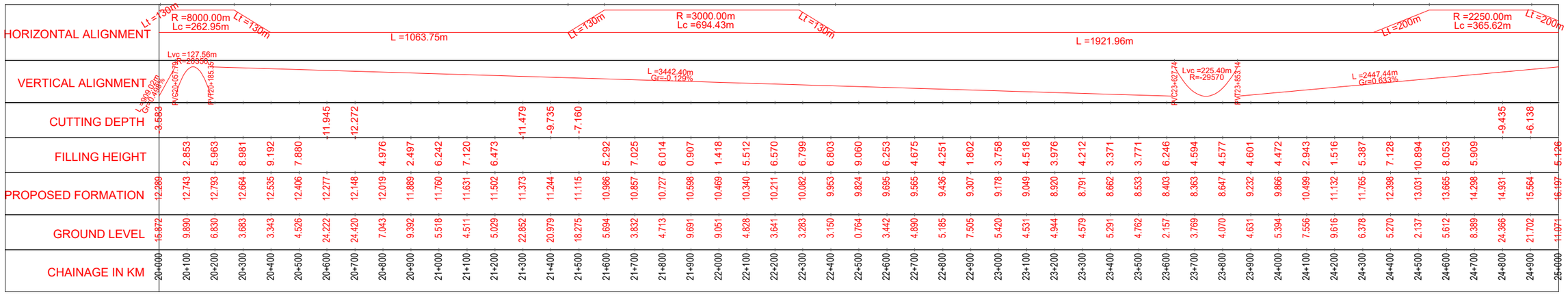
LEGEND :-

- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500





Chainage	Cutting Depth	Filling Height	Proposed Formation	Ground Level
20+000	3.583		12.289	15.872
20+100		2.853	12.743	9.890
20+200		5.963	12.793	6.830
20+300		8.981	12.664	3.683
20+400		9.192	12.535	3.343
20+500		7.880	12.406	4.526
20+600	11.945		12.277	24.222
20+700	12.272		12.148	24.420
20+800		4.976	12.019	7.043
20+900		2.497	11.889	9.392
21+000		6.242	11.760	5.518
21+100		7.120	11.631	4.511
21+200		6.473	11.502	5.029
21+300	11.479		11.373	22.852
21+400	9.735		11.244	20.979
21+500	7.160		11.115	18.275
21+600		5.292	10.986	5.694
21+700		7.025	10.857	3.832
21+800		6.014	10.727	4.713
21+900		0.907	10.598	9.691
22+000		1.418	10.469	9.051
22+100		5.512	10.340	4.828
22+200		6.570	10.211	3.641
22+300		6.799	10.082	3.283
22+400		6.803	9.953	3.150
22+500		9.060	9.824	0.764
22+600		6.253	9.695	3.442
22+700		4.675	9.565	4.890
22+800		4.251	9.436	5.185
22+900		1.802	9.307	7.505
23+000		3.758	9.178	5.420
23+100		4.518	9.049	4.531
23+200		3.976	8.920	4.944
23+300		4.212	8.791	4.579
23+400		3.371	8.662	5.291
23+500		3.771	8.533	4.762
23+600		6.246	8.403	2.157
23+700		4.594	8.363	3.769
23+800		4.577	8.647	4.070
23+900		4.601	9.232	4.631
24+000		4.472	9.866	5.394
24+100		2.943	10.499	7.556
24+200		1.516	11.132	9.616
24+300		5.387	11.765	6.378
24+400		7.128	12.398	5.270
24+500		10.894	13.031	2.137
24+600		8.053	13.665	5.612
24+700		5.909	14.298	8.389
24+800	9.435		14.931	24.366
24+900	6.138		15.564	21.702
25+000		5.126	16.197	11.071

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0006

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 6 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

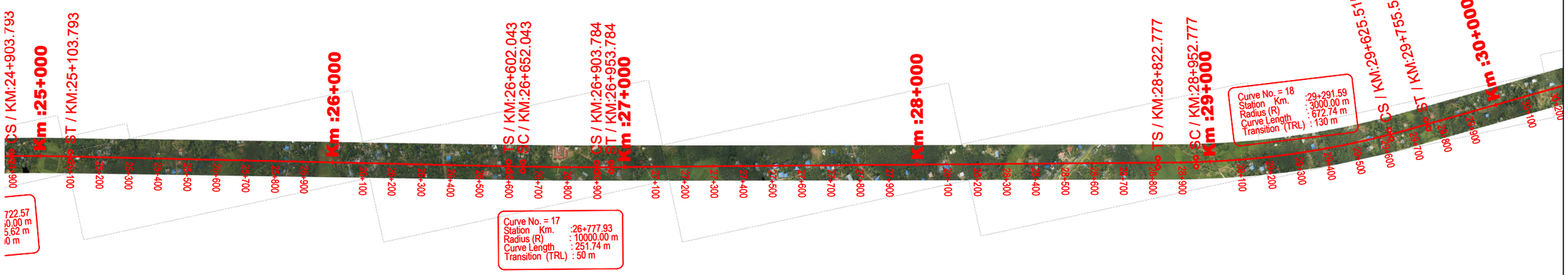
THIRUVANANTHAPURAM

KASARAGOD

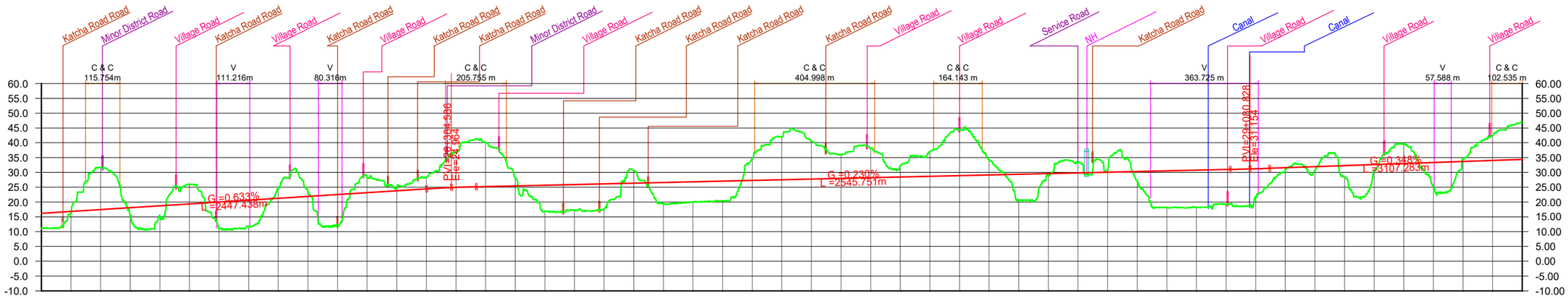
PLAN :
Scale : 1/15000

LEGEND :-

- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



CHAINAGE IN KM	HORIZONTAL ALIGNMENT	VERTICAL ALIGNMENT	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
24+900	Lt =200m			5.126	16.197	11.071
25+100	L =1498.25m			0.835	16.830	15.995
25+200		L =2447.44m Gr=0.633%	-14.184		17.463	31.647
25+300				2.644	18.097	15.453
25+400				3.318	18.730	15.412
25+500			-6.679		19.363	26.042
25+600				9.130	19.996	10.866
25+700				8.905	20.629	11.724
25+800			-3.067		21.262	24.329
25+900			-1.766		21.896	23.662
26+000				10.422	22.529	12.107
26+100			-4.959		23.162	28.121
26+200			-0.848		23.795	24.643
26+300		Lvc =168.01m R=41630 PVI/C26+300.86	-3.967		24.428	28.395
26+400		PVI/26+468.59	12.016		24.943	36.959
26+500			14.820		25.229	40.049
26+600			-2.677		25.458	28.135
26+700	R =-10000.00m Lc =251.74m			8.887	25.688	16.801
26+800				8.674	25.917	17.243
26+900				8.530	26.147	17.617
27+000			-4.311		26.377	30.688
27+100	L =1868.99m			7.098	26.606	19.508
27+200				6.768	26.836	20.068
27+300				6.711	27.065	20.354
27+400			-7.398		27.295	34.693
27+500			14.449		27.524	41.973
27+600		L =2545.75m Gr=0.230%	12.752		27.754	40.506
27+700			-7.924		27.984	35.908
27+800			-9.802		28.213	38.015
27+900			-3.797		28.443	32.240
28+000			-8.334		28.672	37.006
28+100			-15.539		28.902	44.441
28+200			-5.042		29.131	34.173
28+300				9.020	29.361	20.341
28+400				0.094	29.591	29.497
28+500			-3.519		29.820	33.339
28+600			-0.642		30.050	30.692
28+700				3.261	30.279	27.018
28+800				12.320	30.509	18.189
28+900				12.578	30.738	18.160
29+000		Lvc =132.97m R=-112000 PVI/C29+014.34		11.718	30.968	19.250
29+100		PVI/29+147.31		9.528	31.230	21.702
29+200				0.658	31.569	30.911
29+300				1.262	31.917	30.655
29+400				3.734	32.265	28.531
29+500				2.048	32.614	30.566
29+600			-6.573		32.962	39.535
29+700		L =3107.28m Gr=0.348%		8.001	33.310	25.309
29+800			-1.098		33.658	34.756
29+900			-8.572		34.007	42.579
30+000	Lt =130m L =2183.73m		12.588		34.355	46.943

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0007

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 7 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

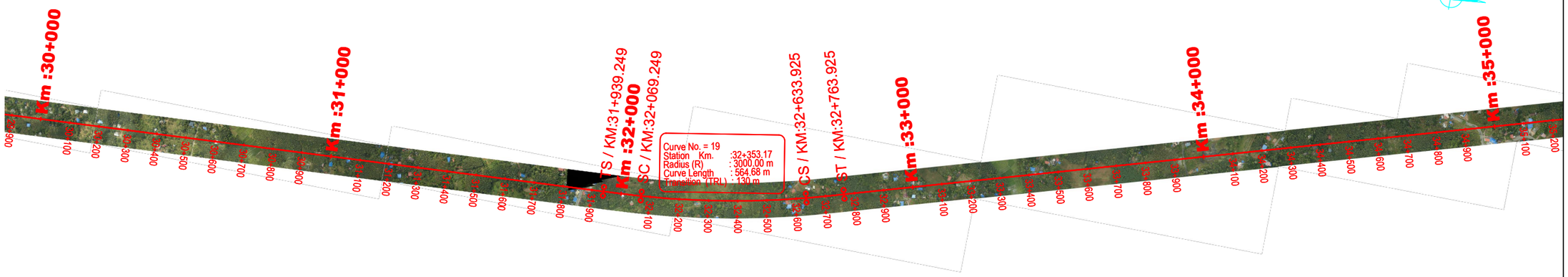
THIRUVANANTHAPURAM

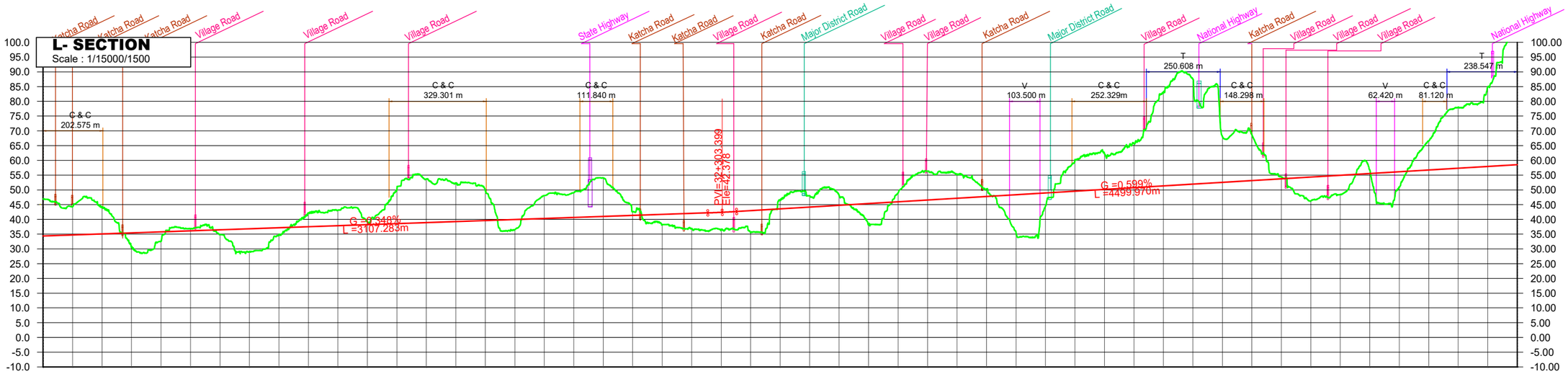
PLAN :
Scale : 1/15000

KASARAGOD

LEGEND :-

- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE





HORIZONTAL ALIGNMENT: L =2183.73m; Lt =130m; R =-3000.00m, Lc =564.68m; Lt =130m; L =3815.14m

VERTICAL ALIGNMENT: L =3107.28m Gr=0.348%; PVC32-254.40; PVI32-352.20; Lvc =97.61m R=-39000; L =4499.97m Gr=0.599%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
30+000	12.588		34.365	46.943
30+100	9.607		34.703	44.310
30+200	8.824		35.052	43.876
30+300		4.792	35.400	30.608
30+400		3.184	35.748	32.564
30+500	0.738		36.096	36.834
30+600		1.621	36.445	34.824
30+700		7.724	36.793	29.069
30+800		2.211	37.141	34.930
30+900	4.641		37.490	42.131
31+000	5.260		37.838	43.098
31+100	0.856		38.186	39.042
31+200	11.443		38.535	49.978
31+300	14.841		38.883	53.724
31+400	12.846		39.231	52.077
31+500	10.269		39.579	49.848
31+600		3.414	39.928	36.514
31+700	7.786		40.276	48.062
31+800	8.394		40.624	49.018
31+900	13.113		40.973	54.086
32+000	1.268		41.321	42.589
32+100		3.489	41.669	38.180
32+200		5.071	42.017	36.946
32+300		5.953	42.392	36.439
32+400		7.401	42.956	35.555
32+500	2.943		43.554	46.497
32+600	3.832		44.153	47.985
32+700	3.433		44.752	48.185
32+800		7.092	45.350	38.258
32+900	2.985		45.949	48.934
33+000	9.822		46.547	56.369
33+100	8.044		47.146	55.190
33+200	2.623		47.744	50.367
33+300		12.690	48.343	35.653
33+400		4.447	48.942	44.495
33+500	10.740		49.540	60.280
33+600	12.155		50.139	62.294
33+700	15.066		50.737	65.803
33+800	31.583		51.336	82.919
33+900	35.579		51.934	87.513
34+000	15.620		52.533	68.153
34+100	15.514		53.132	68.646
34+200	0.701		53.730	54.431
34+300		8.076	54.329	46.253
34+400		6.473	54.927	48.454
34+500	1.214		55.526	56.740
34+600		5.192	56.124	50.932
34+700	9.888		56.723	66.611
34+800	20.695		57.322	78.017
34+900	26.964		57.920	84.884
35+000	44.070		58.519	102.589

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0008

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 8 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

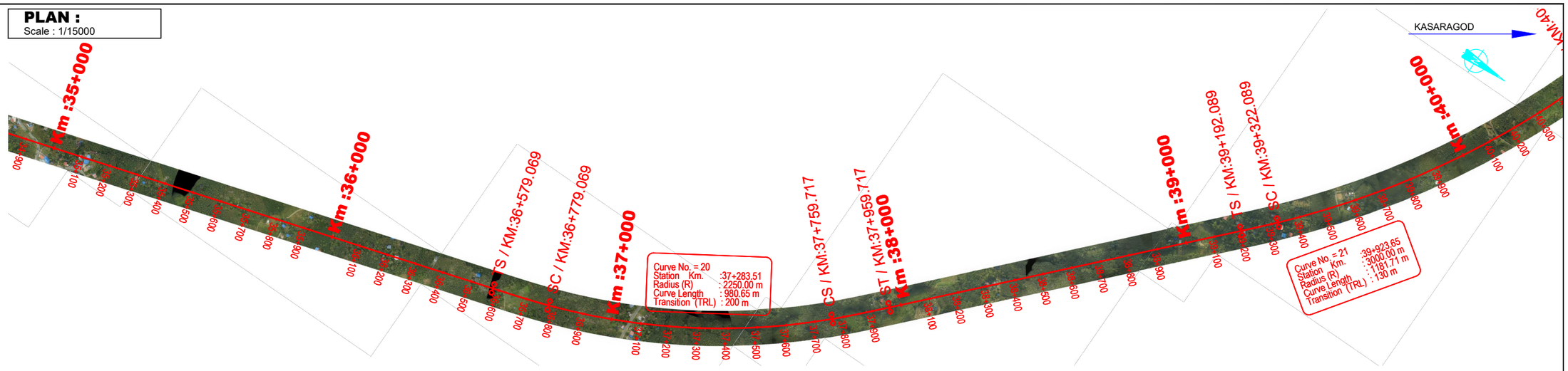
THIRUVANANTHAPURAM

KASARAGOD

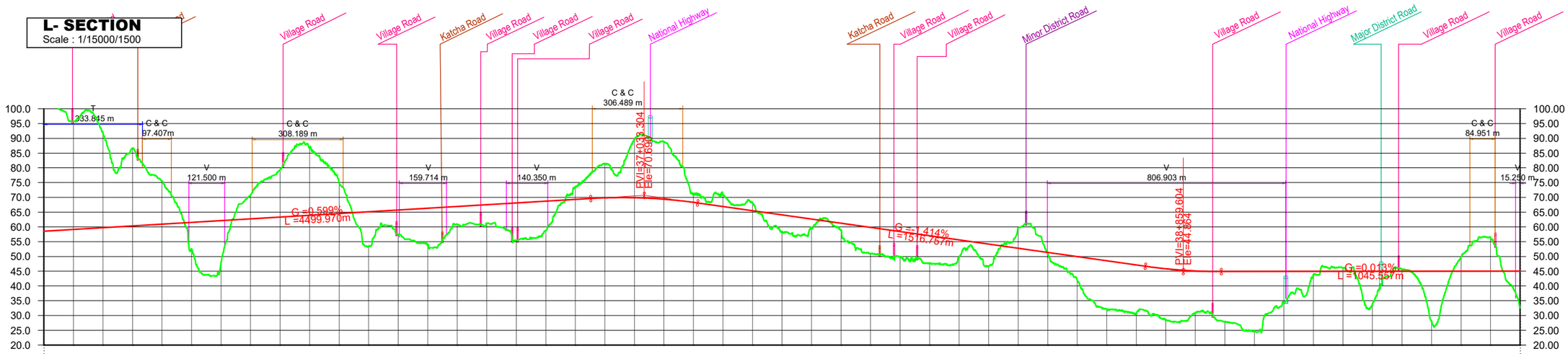
LEGEND :-

C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE

PLAN :
Scale : 1/15000



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT	L =3815.14m; Lt =200m; R =-2250.00m Lc =980.65m; Lt =200m; L =1224.47m; Lt =130m; R =-3000.00m Lc =1196.76m
VERTICAL ALIGNMENT	L =4499.97m Gr=0.599%; PVC36+852.17; Lvc =362.25m R=18000; PVT37+214.42; L=1516.76m Gr=-1.414%; PVC38+731.48; Lvc =256.86m R=-18000; PVT38+988.34; L =1045.56m Gr=0.013%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
35+000	44.070		58.510	102.580
35+100	36.617		59.117	95.734
35+200	32.151		59.716	91.867
35+300	26.381		60.314	86.695
35+400	14.520		60.913	75.433
35+500		8.914	61.512	52.598
35+600		14.006	62.110	48.104
35+700	-8.055		62.709	70.764
35+800	16.006		63.307	79.313
35+900	22.893		63.906	86.799
36+000	10.629		64.505	75.134
36+100		11.566	65.103	53.537
36+200		8.168	65.702	57.534
36+300		12.624	66.300	53.676
36+400		5.946	66.899	60.953
36+500		6.232	67.497	61.265
36+600		12.607	68.096	55.489
36+700		9.952	68.695	58.743
36+800	-4.196		69.293	73.489
36+900	11.722		69.828	81.550
37+000	19.742		69.883	89.625
37+100	19.323		69.383	88.706
37+200	-2.948		68.327	71.275
37+300	-3.871		66.918	70.789
37+400	-2.621		65.504	68.125
37+500		5.670	64.090	58.420
37+600		2.923	62.676	59.753
37+700		2.383	61.262	58.879
37+800		8.896	59.848	50.952
37+900		8.555	58.434	49.879
38+000		9.288	57.020	47.732
38+100		5.877	55.606	49.729
38+200		7.518	54.192	46.674
38+300	-6.897		52.778	59.675
38+400		0.283	51.364	51.081
38+500		7.896	49.949	42.053
38+600		16.394	48.535	32.141
38+700		16.757	47.121	30.364
38+800		17.448	45.839	28.391
38+900		14.163	45.085	30.922
39+000		16.907	44.883	27.976
39+100		20.103	44.896	24.793
39+200		10.284	44.909	34.625
39+300		1.045	44.922	43.877
39+400	-1.298		44.935	46.233
39+500		11.014	44.948	33.934
39+600	-0.069		44.961	45.030
39+700		16.787	44.974	28.187
39+800	-4.690		44.987	49.677
39+900	-11.403		45.000	56.403
40+000		12.352	45.014	32.662

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0009

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 9 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

THIRUVANANTHAPURAM

KASARAGOD

LEGEND :-

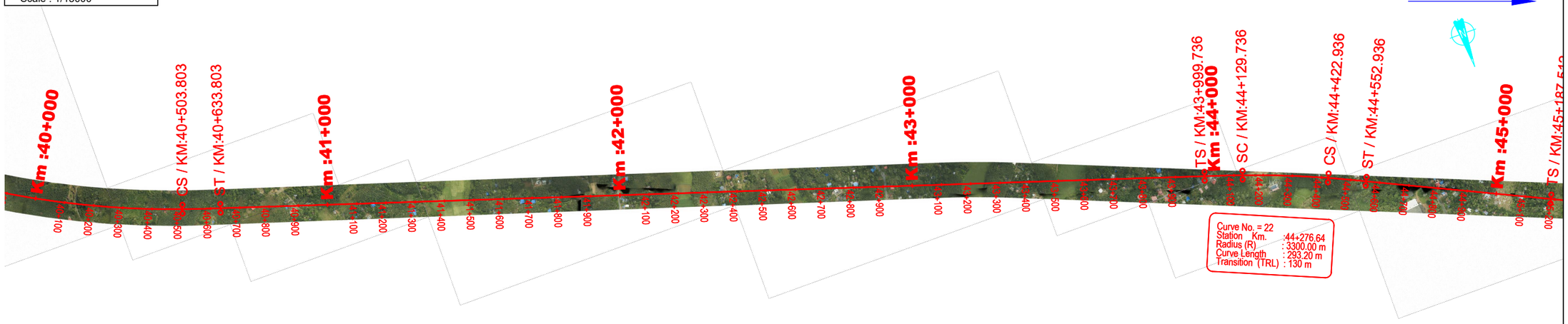
C & C - CUT & COVER

T - TUNNEL

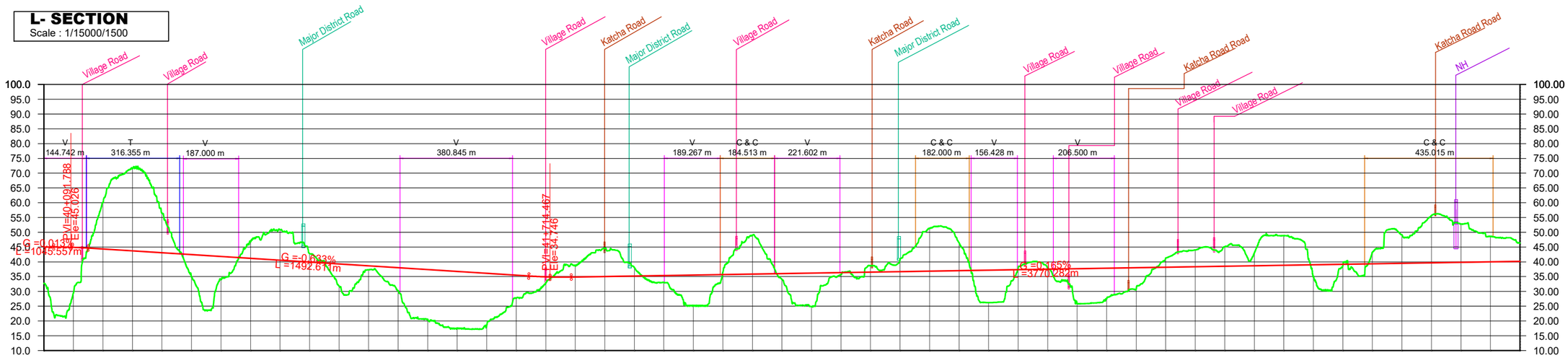
V - VIADUCT

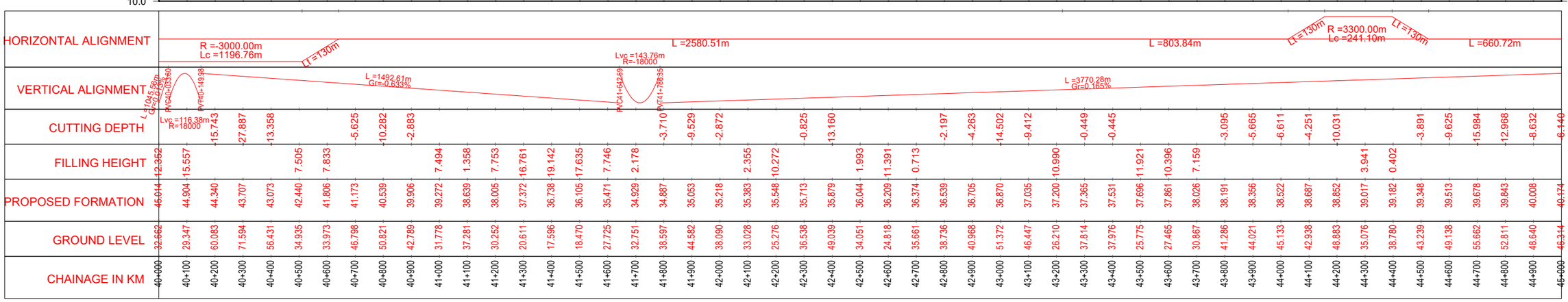
B - RIVER BRIDGE

PLAN :
Scale : 1/15000



L- SECTION
Scale : 1/15000/1500





CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
40+000		12.352	45.014	32.662
40+100		15.557	44.904	29.347
40+200	15.743		44.340	60.083
40+300	27.887		43.707	71.594
40+400	13.358		43.073	56.431
40+500		7.505	42.440	34.935
40+600		7.833	41.806	33.973
40+700	-5.625		41.173	46.798
40+800	10.282		40.539	50.821
40+900	-2.883		39.906	42.789
41+000		7.494	39.272	31.778
41+100		1.358	38.639	37.281
41+200		7.753	38.005	30.252
41+300		16.761	37.372	20.611
41+400		19.142	36.738	17.596
41+500		17.635	36.105	18.470
41+600		7.746	35.471	27.725
41+700		2.178	34.929	32.751
41+800	-3.710		34.887	38.597
41+900	-9.529		35.053	44.582
42+000	-2.872		35.218	38.090
42+100		2.355	35.383	33.028
42+200		10.272	35.548	25.276
42+300	-0.825		35.713	36.538
42+400	13.160		35.879	49.039
42+500		1.993	36.044	34.051
42+600		11.391	36.209	24.818
42+700		0.713	36.374	35.661
42+800	-2.197		36.539	38.736
42+900	-4.263		36.705	40.968
43+000	-14.502		36.870	51.372
43+100	-9.412		37.035	46.447
43+200		10.990	37.200	26.210
43+300	-0.449		37.365	37.814
43+400	-0.445		37.531	37.976
43+500		11.921	37.696	25.775
43+600		10.396	37.861	27.465
43+700		7.159	38.026	30.867
43+800	-3.095		38.191	41.286
43+900	-5.665		38.356	44.021
44+000	-6.611		38.522	45.133
44+100	-4.251		38.687	42.938
44+200	10.031		38.852	48.883
44+300		3.941	39.017	35.076
44+400		0.402	39.182	38.780
44+500	-3.891		39.348	43.239
44+600	-9.625		39.513	49.138
44+700	-15.984		39.678	55.662
44+800	12.968		39.843	52.811
44+900	-8.632		40.008	48.640
45+000	-6.140		40.174	46.314

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL /0010

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 10 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

THIRUVANANTHAPURAM

KASARAGOD

LEGEND :-

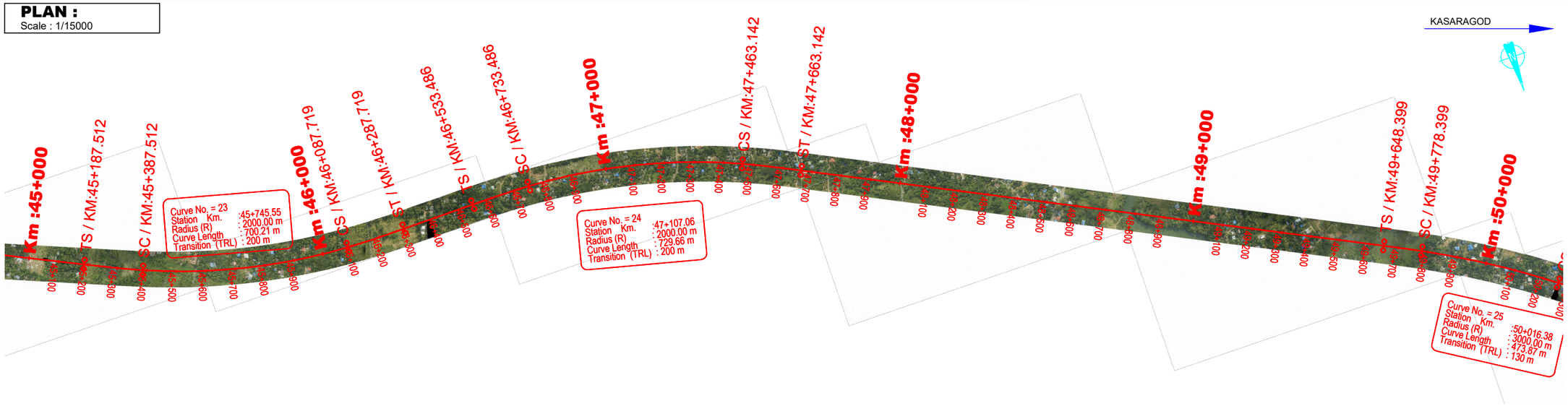
C & C - CUT & COVER

T - TUNNEL

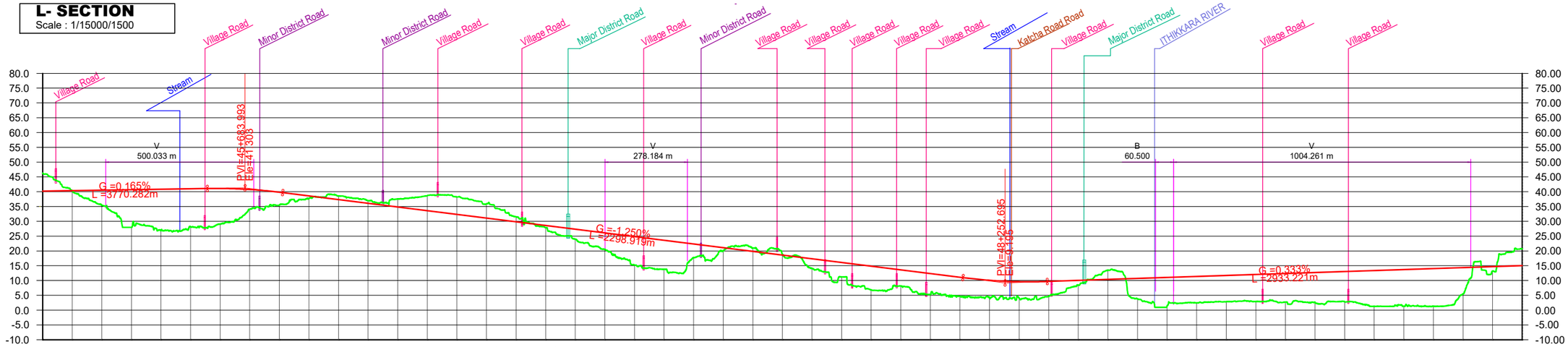
V - VIADUCT

B - RIVER BRIDGE

PLAN :
Scale : 1/15000



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: L =660.72m; Lt =200m; R =-2000.00m Lc =700.21m; Lt =200m; L =245.77m; Lt =200m; R =2000.00m Lc =729.66m; Lt =200m; L =1985.26m; Lt =130m; R =3000.00m Lc =473.87m

VERTICAL ALIGNMENT: L =3770.28m Gr=0.165%; PVC45+556.83; Lvc =254.72m R=18000; PVT45+811.35; L =2298.92m Gr=-1.250%; PVC48+110.27; Lvc =284.87m R=-18000; PVT48+395.13; L =2933.22m Gr=0.333%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
45+000	-6.140		40.174	46.314
45+100	-0.094		40.339	40.433
45+200		5.089	40.504	35.415
45+300		12.723	40.669	27.946
45+400		13.967	40.834	26.867
45+500		12.851	41.000	28.149
45+600		12.015	41.112	29.097
45+700		6.634	40.759	34.125
45+800		4.311	39.850	35.539
45+900		0.876	38.603	37.727
46+000	-1.224		37.353	38.577
46+100	-0.868		36.103	36.971
46+200	-2.675		34.853	37.528
46+300	-5.092		33.603	38.695
46+400	-5.890		32.353	38.243
46+500	-4.860		31.103	35.963
46+600	-1.678		29.853	31.531
46+700		0.780	28.603	27.823
46+800		3.374	27.353	23.979
46+900		5.561	26.103	20.542
47+000		9.652	24.853	15.201
47+100		9.785	23.603	13.818
47+200		4.589	22.353	17.764
47+300		1.051	21.103	20.052
47+400	-1.107		19.853	20.960
47+500	-0.178		18.603	18.781
47+600		3.351	17.353	14.002
47+700		4.864	16.103	11.239
47+800		8.030	14.853	6.823
47+900		5.431	13.603	8.172
48+000		7.048	12.353	5.305
48+100		6.392	11.103	4.711
48+200		6.095	10.077	3.982
48+300		5.487	9.604	4.117
48+400		5.071	9.685	4.614
48+500		1.610	10.018	8.408
48+600	-3.151		10.350	13.501
48+700		6.869	10.683	3.814
48+800		9.584	11.016	1.432
48+900		8.905	11.348	2.443
49+000		8.833	11.681	2.848
49+100		9.158	12.014	2.856
49+200		9.619	12.346	2.727
49+300		10.008	12.679	2.671
49+400		10.181	13.012	2.831
49+500		12.093	13.345	1.252
49+600		12.359	13.677	1.318
49+700		12.689	14.010	1.321
49+800		8.827	14.343	5.516
49+900		1.508	14.675	13.167
50+000	5.656		15.008	20.664

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0011

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 11 of 108

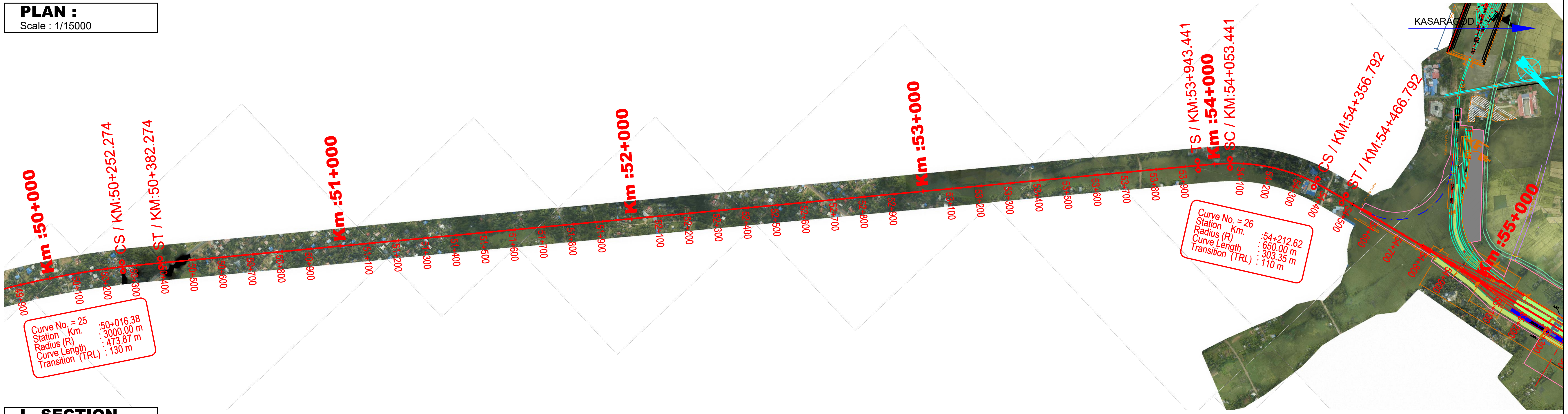
DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

THIRUVANANTHAPURAM

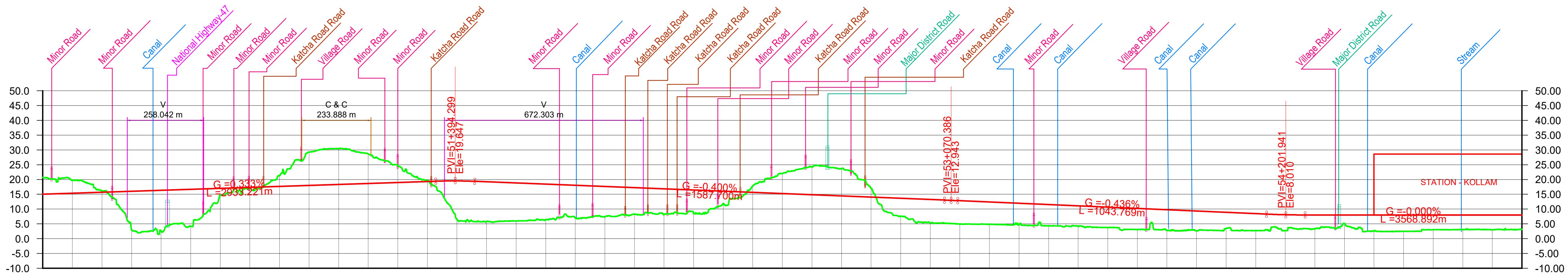
PLAN :
Scale : 1/15000

LEGEND :-

- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: R =3000.00m Lc =473.87m; Lt =130m; L =3561.17m; Lt =110m; R =650.00m Lc =303.35m; Lt =110m; L =2000.56m

VERTICAL ALIGNMENT: L =2933.22m Gr=0.333%; PVC51+328.36; Lvc =131.89m R=18000; PVT51+460.24; L =1587.70m Gr=-0.400%; PVC53+047.94; Lvc =44.89m R=125000; PVT53+092.83; L =1043.77m Gr=-0.436%; PVC54+136.60; Lvc =130.68m R=-30000; PVT54+267.28; L =3568.89m Gr=-0.000%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
50+000	-5.656		15.008	20.664
50+100	-4.361		15.341	19.702
50+200	-0.432		15.673	16.105
50+300		13.022	16.006	2.984
50+400		13.840	16.339	2.499
50+500		12.435	16.672	4.237
50+600		2.329	17.004	14.675
50+700		0.429	17.337	16.908
50+800	-3.714		17.670	21.384
50+900	-11.259		18.002	29.261
51+000	-12.106		18.335	30.441
51+100	-9.981		18.668	28.649
51+200	-5.930		19.000	24.930
51+300	-0.308		19.333	19.641
51+400		13.044	19.523	6.479
51+500		13.330	19.224	5.894
51+600		12.857	18.824	5.967
51+700		12.018	18.424	6.406
51+800		10.990	18.024	7.034
51+900		10.322	17.624	7.302
52+000		8.945	17.224	8.279
52+100		8.756	16.824	8.068
52+200		7.956	16.424	8.468
52+300		4.189	16.024	11.835
52+400	-2.260		15.624	17.884
52+500	-6.844		15.224	22.068
52+600	-9.530		14.824	24.354
52+700	-9.274		14.424	23.698
52+800	-3.061		14.024	17.085
52+900		6.043	13.624	7.581
53+000		7.932	13.224	5.292
53+100		7.894	12.813	4.919
53+200		7.508	12.378	4.870
53+300		7.262	11.942	4.680
53+400		7.153	11.506	4.353
53+500		6.836	11.070	4.234
53+600		6.885	10.634	3.749
53+700		7.073	10.198	3.125
53+800		7.026	9.762	2.736
53+900		6.675	9.326	2.651
54+000		5.465	8.890	3.425
54+100		5.750	8.454	2.704
54+200		5.375	8.085	2.710
54+300		4.712	8.010	3.298
54+400		2.859	8.009	5.150
54+500		5.472	8.009	2.537
54+600		5.533	8.009	2.476
54+700		4.987	8.009	3.022
54+800		4.958	8.008	3.050
54+900		5.031	8.008	2.977
55+000		4.920	8.008	3.088

Client :
Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:
SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:
HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:
SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0012

General Consultant : SYSTRA

Drawing Scale :
Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 12 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

THIRUVANANTHAPURAM

KASARAGOD

LEGEND :-

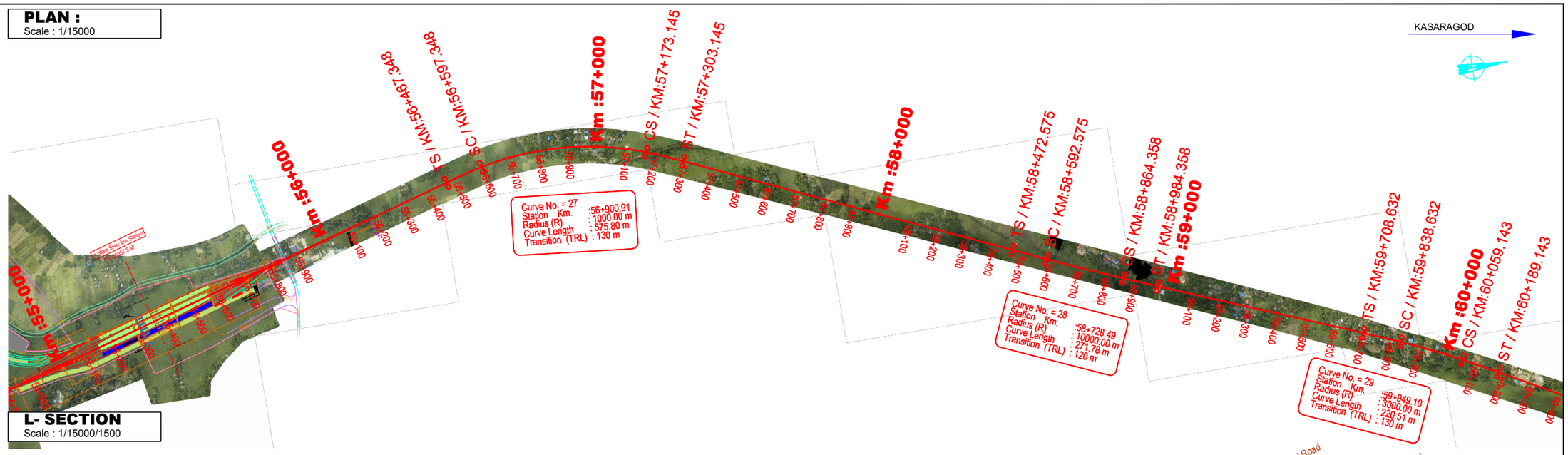
C & C - CUT & COVER

T - TUNNEL

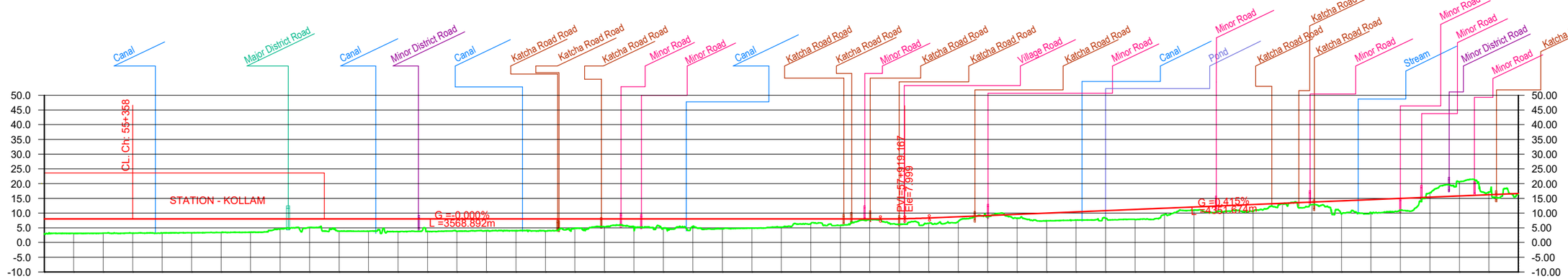
V - VIADUCT

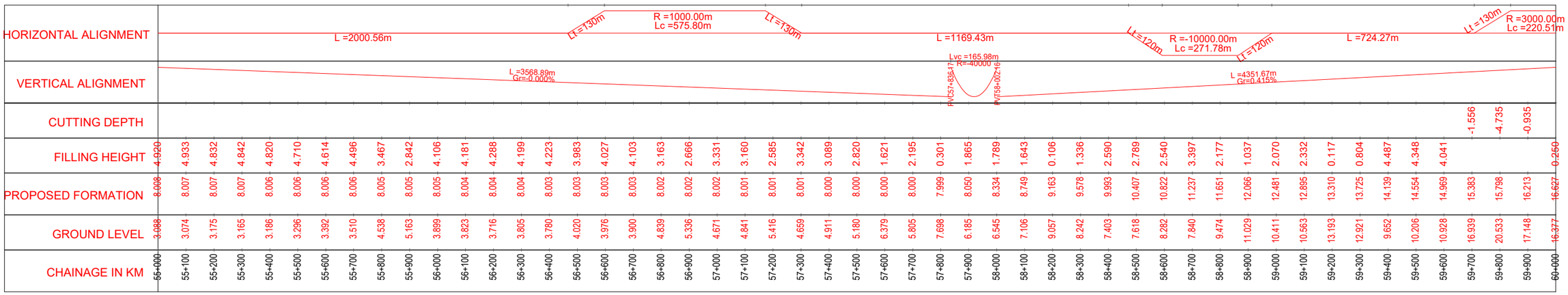
B - RIVER BRIDGE

PLAN :
Scale : 1/15000



L- SECTION
Scale : 1/15000/1500





CHAINAGE IN KM	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL	CUTTING DEPTH
55+000	4.920	8.008	3.088	
55+100	4.933	8.007	3.074	
55+200	4.832	8.007	3.175	
55+300	4.842	8.007	3.165	
55+400	4.820	8.006	3.186	
55+500	4.710	8.006	3.296	
55+600	4.614	8.006	3.392	
55+700	4.496	8.006	3.510	
55+800	3.467	8.005	4.538	
55+900	2.842	8.005	5.163	
56+000	4.106	8.005	3.899	
56+100	4.181	8.004	3.823	
56+200	4.288	8.004	3.716	
56+300	4.199	8.004	3.805	
56+400	4.223	8.003	3.780	
56+500	3.983	8.003	4.020	
56+600	4.027	8.003	3.976	
56+700	4.103	8.003	3.900	
56+800	3.163	8.002	4.839	
56+900	2.666	8.002	5.336	
57+000	3.331	8.002	4.671	
57+100	3.160	8.001	4.841	
57+200	2.585	8.001	5.416	
57+300	3.342	8.001	4.659	
57+400	3.089	8.000	4.911	
57+500	2.820	8.000	5.180	
57+600	1.621	8.000	6.379	
57+700	2.195	8.000	5.805	
57+800	0.301	7.999	7.698	
57+900	1.865	8.050	6.185	
58+000	1.789	8.334	6.545	
58+100	1.643	8.749	7.106	
58+200	0.106	9.163	9.057	
58+300	1.336	9.578	8.242	
58+400	2.590	9.993	7.403	
58+500	2.789	10.407	7.618	
58+600	2.540	10.822	8.282	
58+700	3.397	11.237	7.840	
58+800	2.177	11.651	9.474	
58+900	1.037	12.066	11.029	
59+000	2.070	12.481	10.411	
59+100	2.332	12.895	10.563	
59+200	0.117	13.310	13.193	
59+300	0.804	13.725	12.921	
59+400	4.487	14.139	9.652	
59+500	4.348	14.554	10.206	
59+600	4.041	14.969	10.928	
59+700		15.383	16.939	-1.556
59+800		15.798	20.533	-4.735
59+900		16.213	17.148	-0.935
60+000	0.250	16.627	16.377	

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM THIRUVANANTHAPURAM TO KOLLAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0013

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 13 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

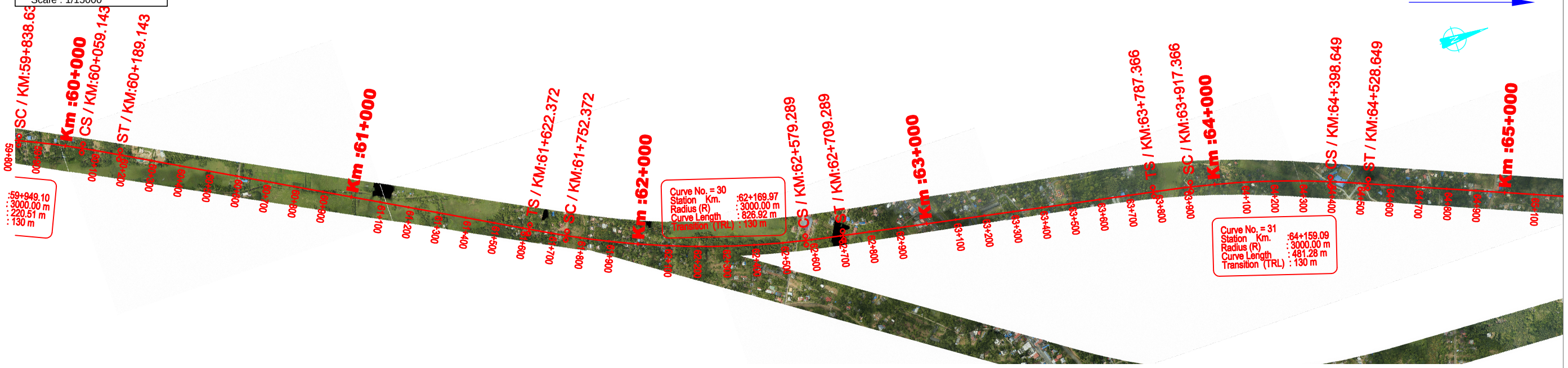
THIRUVANANTHAPURAM

KASARAGOD

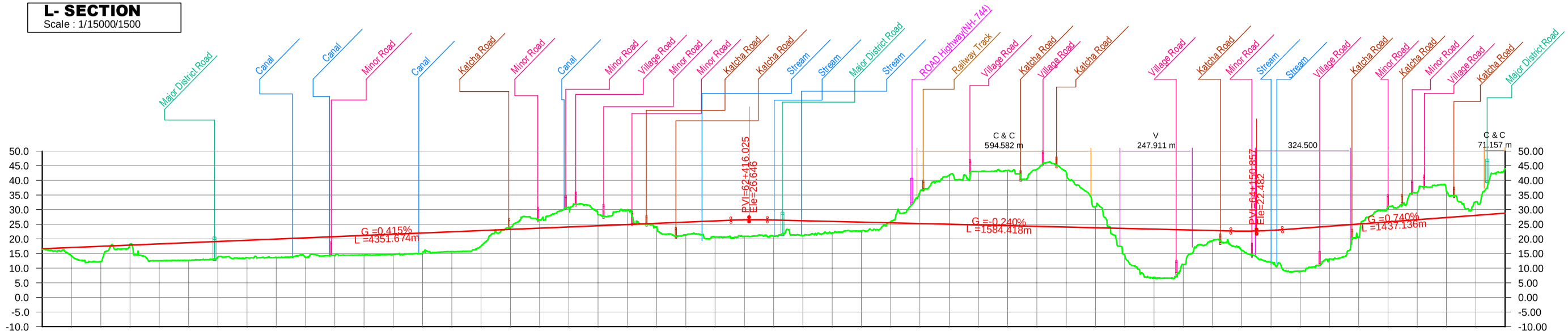
PLAN :
Scale : 1/15000

LEGEND :-

C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: R =3000.00m, Lc =220.51m; Lt =130m; L =1433.23m; Lt =130m; R =-3000.00m, Lc =826.92m; Lt =130m; L =1078.08m; Lt =130m; R =3000.00m, Lc =481.28m; Lt =130m; L =996.51m

VERTICAL ALIGNMENT: L =4351.67m, G=0.415%; PVI62+353.33; Lvc =124.39m, R=19000; PVI62+478.22; L =1584.42m, G=-0.240%; Lvc =176.44m, R=-18000; PVI64+092.84; PVI64+239.96; L =1437.14m, G=0.740%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
60+000		0.250	16.627	16.377
60+100		2.875	17.042	14.167
60+200		5.237	17.457	12.220
60+300	-0.285		17.871	18.156
60+400		5.758	18.286	12.528
60+500		6.063	18.701	12.638
60+600		5.463	19.115	13.652
60+700		5.921	19.530	13.609
60+800		6.255	19.945	13.690
60+900		6.626	20.359	13.733
61+000		6.540	20.774	14.234
61+100		6.664	21.189	14.525
61+200		6.943	21.603	14.660
61+300		6.798	22.018	15.220
61+400		6.820	22.433	15.613
61+500		5.309	22.847	17.538
61+600	-0.719		23.262	23.981
61+700	-2.830		23.677	26.507
61+800	-6.714		24.091	30.805
61+900	-3.781		24.506	28.287
62+000	-5.102		24.921	30.023
62+100		1.282	25.335	24.053
62+200		4.450	25.750	21.300
62+300		5.509	26.165	20.656
62+400		5.602	26.523	20.921
62+500		5.545	26.444	20.899
62+600		5.058	26.204	21.146
62+700		3.931	25.964	22.033
62+800		3.011	25.724	22.713
62+900	-0.411		25.484	25.895
63+000	-10.850		25.244	36.094
63+100	-16.728		25.004	41.732
63+200	-18.222		24.764	42.986
63+300	-18.787		24.524	43.311
63+400	-19.513		24.284	43.797
63+500	-18.758		24.044	42.802
63+600	-7.241		23.804	31.045
63+700		9.226	23.564	14.338
63+800		16.468	23.324	6.856
63+900		11.813	23.084	11.271
64+000		3.524	22.844	19.320
64+100		6.662	22.643	15.981
64+200		10.835	22.888	12.053
64+300		14.654	23.586	8.932
64+400		11.220	24.326	13.106
64+500		4.556	25.067	20.511
64+600	-4.865		25.807	30.672
64+700	-9.238		26.547	35.785
64+800	-8.975		27.287	36.262
64+900	-4.614		28.028	32.642
65+000	15.220		28.768	43.988

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0014

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 14 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

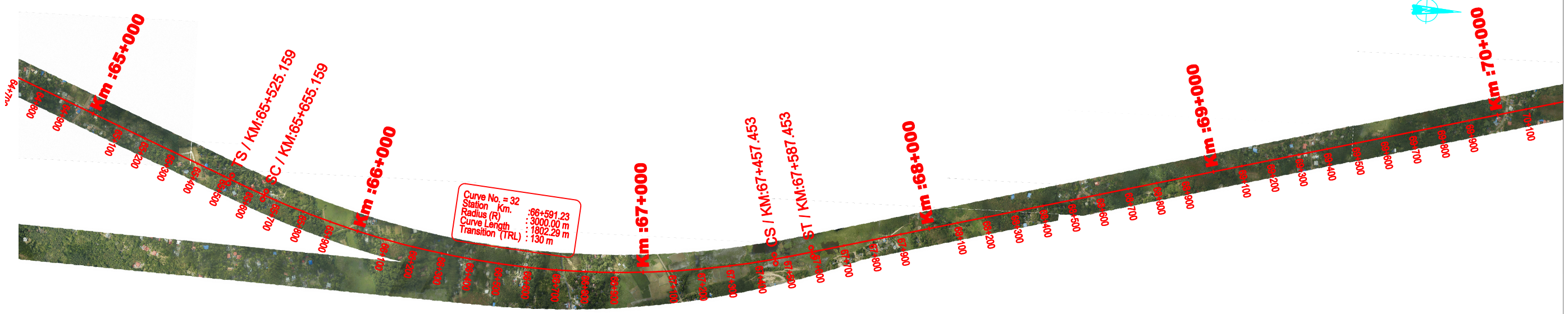
THIRUVANANTHAPURAM

KASARAGOD

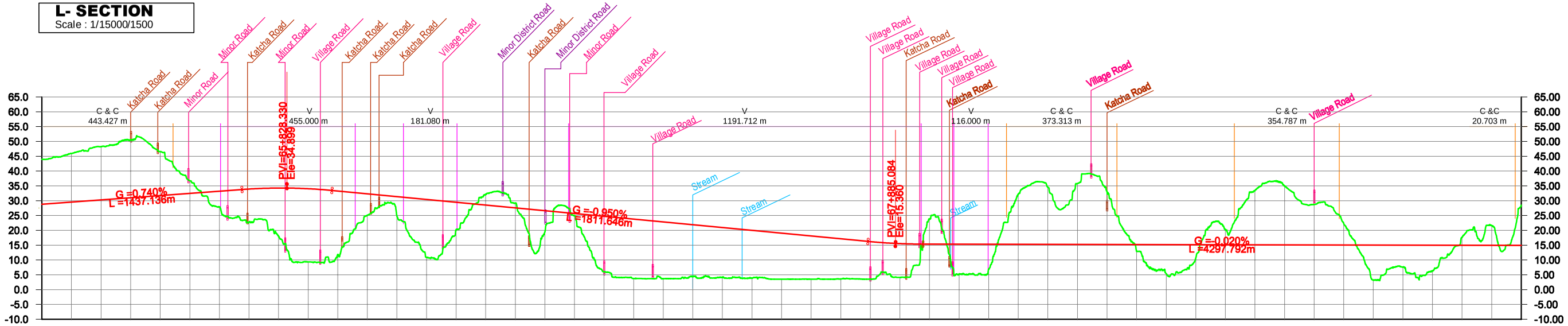
PLAN :
Scale : 1/15000

LEGEND :-

C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: L =996.51m; Lt =130m; R =-3000.00m, Lc =1802.29m; Lt =130m; L =5371.13m

VERTICAL ALIGNMENT: L =1437.14m, Gr=0.740%; PVI65+876.21; Lvc =304.23m, R=18000; PVI65+980.44; L =1811.65m, Gr=-0.950%; PVI67+792.09; Lvc =185.99m, R=-20000; PVI67+978.08; L =4297.79m, Gr=-0.020%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
65+000	15.220		28.768	43.988
65+100	16.434		29.508	45.942
65+200	18.007		30.248	48.255
65+300	19.465		30.989	50.454
65+400	14.784		31.729	46.513
65+500	4.253		32.469	36.722
65+600		5.343	33.209	27.866
65+700		11.237	33.934	22.697
65+800		16.255	34.264	18.009
65+900		24.702	34.039	9.337
66+000		21.502	33.269	11.767
66+100		7.278	32.319	25.041
66+200		6.555	31.369	24.814
66+300		19.587	30.419	10.832
66+400		9.240	29.469	20.229
66+500	3.591		28.519	32.110
66+600	1.596		27.569	29.165
66+700		7.142	26.619	19.477
66+800		0.751	25.669	24.918
66+900		18.705	24.719	6.014
67+000		20.016	23.769	3.753
67+100		19.162	22.819	3.657
67+200		17.600	21.869	4.269
67+300		16.866	20.919	4.053
67+400		16.138	19.969	3.831
67+500		15.514	19.019	3.505
67+600		14.582	18.069	3.487
67+700		13.521	17.119	3.598
67+800		12.616	16.170	3.554
67+900		11.387	15.510	4.123
68+000	8.334		15.337	23.671
68+100		10.071	15.317	5.246
68+200		8.383	15.297	6.914
68+300	16.960		15.277	32.237
68+400	19.244		15.257	34.501
68+500	20.584		15.237	35.821
68+600	17.636		15.217	32.853
68+700		2.296	15.197	12.901
68+800		9.782	15.177	5.395
68+900		4.541	15.157	10.616
69+000	5.203		15.137	20.340
69+100	18.267		15.117	33.384
69+200	19.967		15.097	35.064
69+300	13.645		15.077	28.722
69+400	7.229		15.057	22.286
69+500		11.878	15.037	3.159
69+600		7.441	15.017	7.576
69+700		8.613	14.997	6.384
69+800	2.653		14.977	17.630
69+900	6.683		14.957	21.640
70+000	13.664		14.937	28.601

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0015

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 15 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

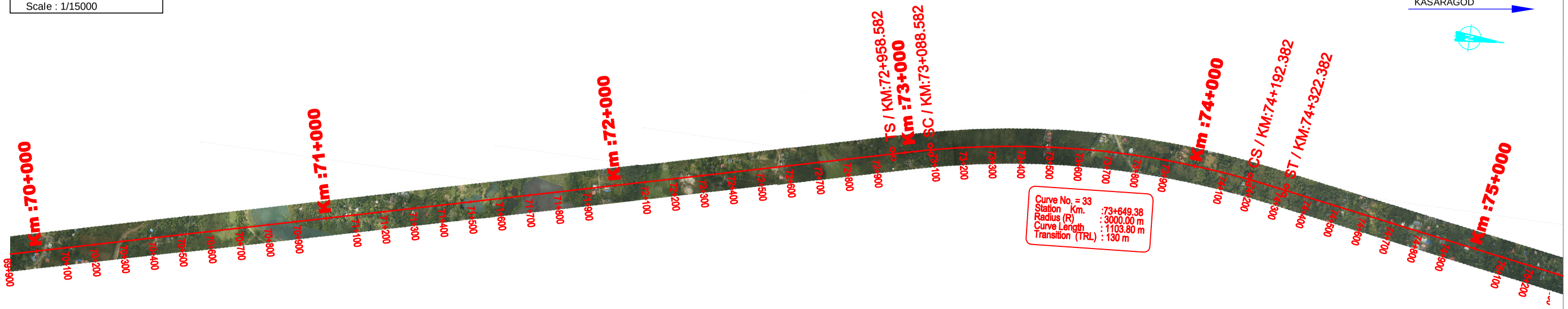
THIRUVANANTHAPURAM

KASARAGOD

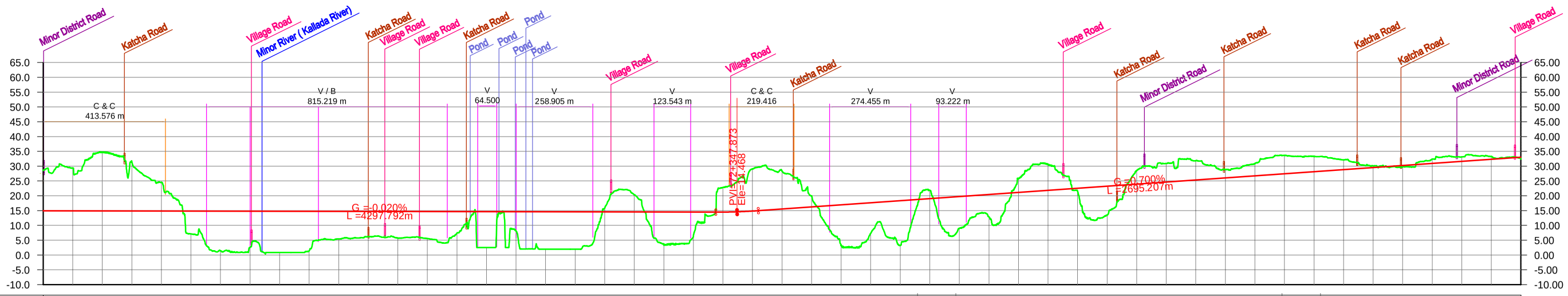
PLAN :
Scale : 1/15000

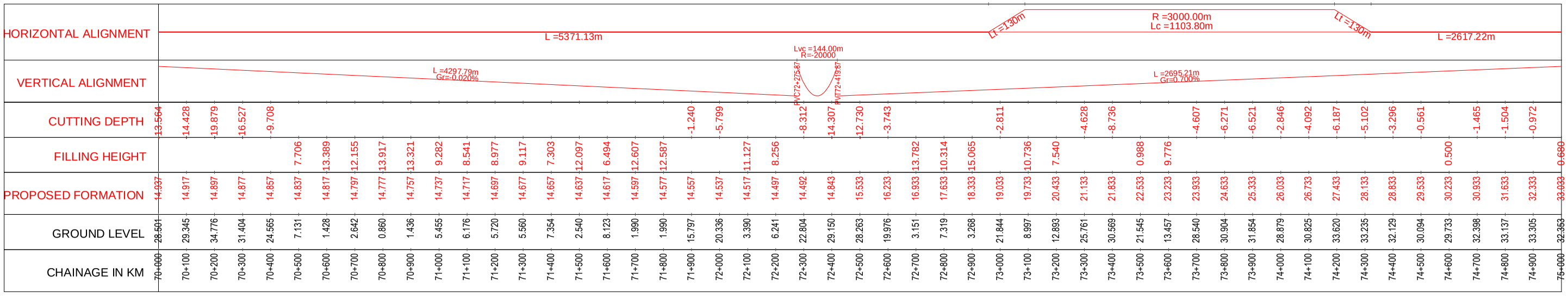
LEGEND :-

C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500





CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
70+000	13.564		14.937	28.501
70+100	14.428		14.917	29.345
70+200	19.879		14.897	34.776
70+300	16.527		14.877	31.404
70+400	9.708		14.857	24.565
70+500		7.706	14.837	7.131
70+600		13.389	14.817	1.428
70+700		12.155	14.797	2.642
70+800		13.917	14.777	0.860
70+900		13.321	14.757	1.436
71+000		9.282	14.737	5.455
71+100		8.541	14.717	6.176
71+200		8.977	14.697	5.720
71+300		9.117	14.677	5.560
71+400		7.303	14.657	7.354
71+500		12.097	14.637	2.540
71+600		6.494	14.617	8.123
71+700		12.607	14.597	1.990
71+800		12.587	14.577	1.990
71+900	1.240		14.557	15.797
72+000	5.799		14.537	20.336
72+100		11.127	14.517	3.390
72+200		8.256	14.497	6.241
72+300	8.312		14.492	22.804
72+400	14.307		14.843	29.150
72+500	12.730		15.533	28.263
72+600	3.743		16.233	19.976
72+700		13.782	16.933	3.151
72+800		10.314	17.633	7.319
72+900		15.065	18.333	3.268
73+000	2.811		19.033	21.844
73+100		10.736	19.733	8.997
73+200		7.540	20.433	12.893
73+300	4.628		21.133	25.761
73+400	8.736		21.833	30.569
73+500		0.988	22.533	21.545
73+600		9.776	23.233	13.457
73+700	4.607		23.933	28.540
73+800	6.271		24.633	30.904
73+900	6.521		25.333	31.854
74+000	2.846		26.033	28.879
74+100	4.092		26.733	30.825
74+200	6.187		27.433	33.620
74+300	5.102		28.133	33.235
74+400	3.296		28.833	32.129
74+500	0.561		29.533	30.094
74+600		0.500	30.233	29.733
74+700	1.465		30.933	32.398
74+800	1.504		31.633	33.137
74+900	0.972		32.333	33.305
75+000		0.680	33.033	32.353

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0016

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 16 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

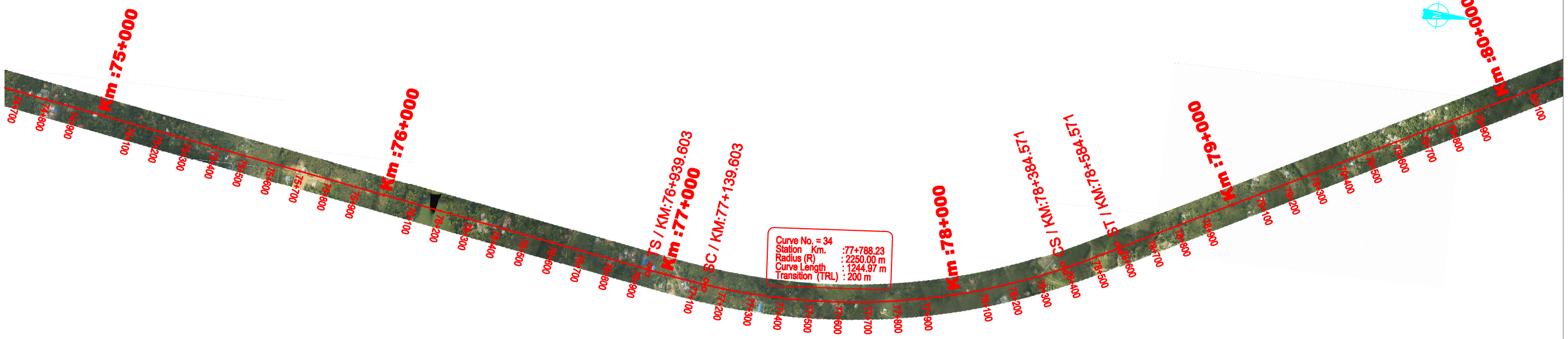
THIRUVANANTHAPURAM

KASARAGOD

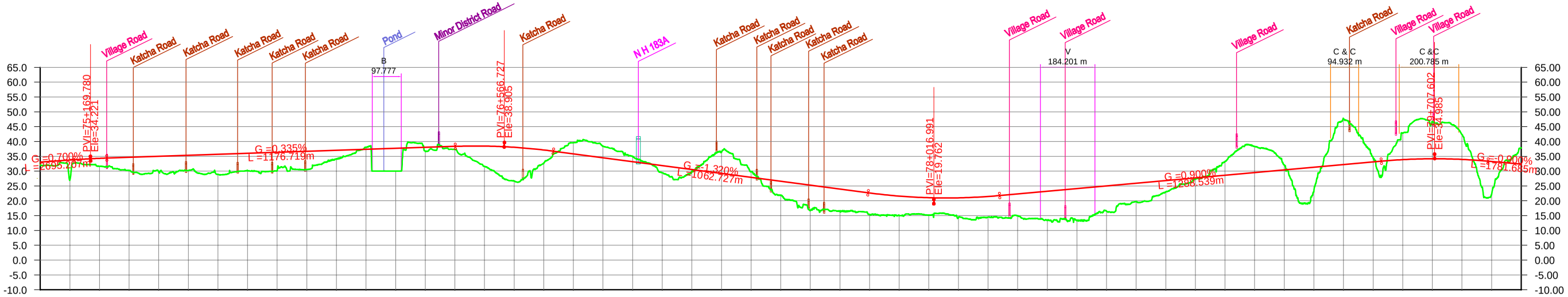
PLAN :
Scale : 1/15000

LEGEND :-

C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT	L =2617.22m; Lt =200m; R =-2250.00m Lc =1244.97m; Lt =200m; L =2473.03m
VERTICAL ALIGNMENT	L =2695.41m Gr=0.700%; PVI/G75+115.88; Lvc =109.41m R=30000; PVI/T75+224.48; L =1176.72m Gr=0.335%; PVI/C76+401.20; Lvc =331.04m R=20000; PVI/T76+732.24; L =1062.73m Gr=-1.320%; PVI/C77+794.97; Lvc =444.06m R=-20000; PVI/T78+239.83; L =1288.54m Gr=0.900%; PVI/C79+527.56; Lvc =360.08m R=20000; PVI/T79+887.64; L =1781.68m Gr=-0.900%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
75+000		0.680	33.033	32.353
75+100		6.759	33.733	26.974
75+200		2.705	34.312	31.607
75+300		4.418	34.658	30.240
75+400		5.307	34.993	29.686
75+500		5.115	35.328	30.213
75+600		6.748	35.664	28.916
75+700		5.853	35.999	30.146
75+800		6.221	36.334	30.113
75+900		6.098	36.670	30.572
76+000		2.926	37.005	34.079
76+100	-0.719		37.340	38.059
76+200		7.655	37.675	30.020
76+300		1.298	38.011	36.713
76+400		1.016	38.346	37.330
76+500		6.834	38.437	31.603
76+600		11.355	38.029	26.674
76+700		4.566	37.120	32.554
76+800	-3.763		35.826	39.589
76+900	-3.864		34.506	38.370
77+000	-1.810		33.186	34.996
77+100		2.443	31.866	29.423
77+200		0.600	30.546	29.946
77+300	-7.193		29.226	36.419
77+400	-1.867		27.906	29.773
77+500		4.754	26.586	21.832
77+600		8.575	25.266	16.691
77+700		7.270	23.946	16.676
77+800		7.237	22.626	15.389
77+900		6.537	21.582	15.045
78+000		5.863	21.037	15.174
78+100		6.506	20.992	14.486
78+200		6.928	21.448	14.520
78+300		7.358	22.310	14.952
78+400		9.807	23.210	13.403
78+500		10.862	24.111	13.249
78+600		8.526	25.011	16.485
78+700		6.100	25.912	19.812
78+800		3.880	26.812	22.932
78+900		0.435	27.713	27.278
79+000	-4.634		28.613	33.247
79+100	-8.784		29.514	38.298
79+200	-1.604		30.414	32.018
79+300		8.233	31.314	23.081
79+400	-15.444		32.215	47.659
79+500	-1.327		33.115	34.442
79+600	-8.886		33.885	42.771
79+700	-12.562		34.173	46.735
79+800	-8.360		33.961	42.321
79+900		11.192	33.253	22.061
80+000	-5.547		32.353	37.900

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0017

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 17 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

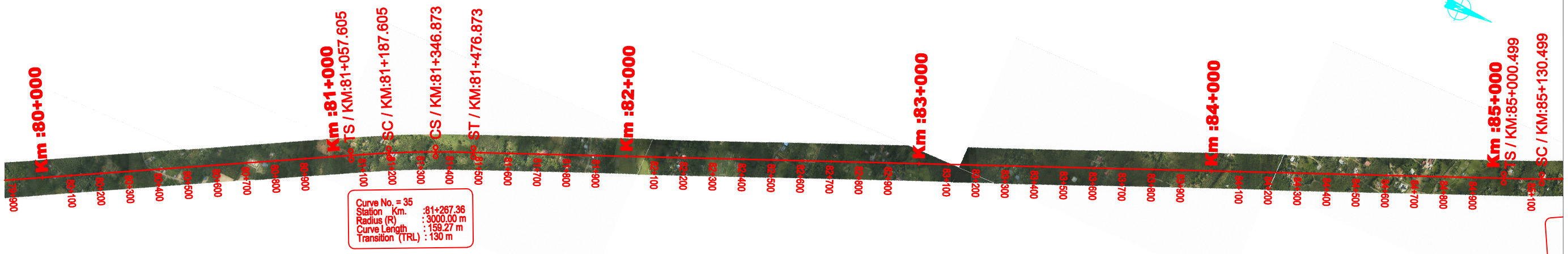
THIRUVANANTHAPURAM

KASARAGOD

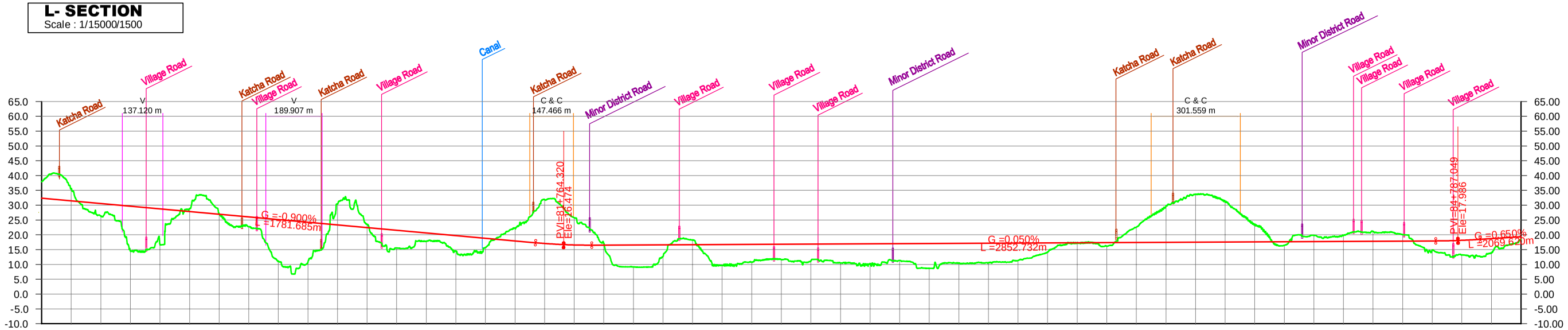
PLAN :
Scale : 1/15000

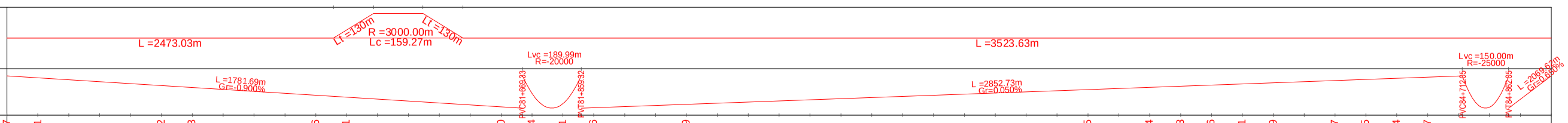
LEGEND :-

C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500





CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
80+000	-5.547		32.353	37.900
80+100	-4.191		31.453	35.644
80+200		4.142	30.553	26.411
80+300		15.233	29.653	14.420
80+400		12.004	28.753	16.749
80+500	-1.032		27.853	28.885
80+600	-0.263		26.953	27.216
80+700		3.300	26.053	22.753
80+800		13.995	25.153	11.158
80+900		13.514	24.253	10.739
81+000	-7.066		23.353	30.419
81+100	-1.031		22.453	23.484
81+200		5.993	21.553	15.560
81+300		2.853	20.653	17.800
81+400		5.212	19.753	14.541
81+500		3.187	18.853	15.666
81+600	-4.440		17.953	22.393
81+700	-14.784		17.077	31.861
81+800	-9.191		16.580	25.771
81+900	-0.616		16.542	17.158
82+000		7.420	16.592	9.172
82+100		4.042	16.642	12.600
82+200	-1.579		16.692	18.271
82+300		7.080	16.742	9.662
82+400		6.038	16.792	10.754
82+500		5.235	16.842	11.607
82+600		5.766	16.892	11.126
82+700		6.419	16.942	10.523
82+800		6.680	16.992	10.312
82+900		5.675	17.042	11.367
83+000		8.448	17.092	8.644
83+100		6.605	17.142	10.537
83+200		6.658	17.192	10.534
83+300		5.922	17.242	11.320
83+400		3.164	17.292	14.128
83+500	-0.035		17.342	17.377
83+600		1.241	17.392	16.151
83+700	-5.134		17.442	22.576
83+800	-12.133		17.492	29.625
83+900	-16.196		17.542	33.738
84+000	-13.461		17.592	31.053
84+100	-5.919		17.642	23.561
84+200		1.220	17.692	16.472
84+300	-2.067		17.742	19.809
84+400	-2.005		17.792	19.797
84+500	-3.274		17.842	21.116
84+600	-2.167		17.892	20.059
84+700		3.074	17.942	14.868
84+800		4.989	18.147	13.158
84+900		4.871	18.720	13.849
85+000		0.892	19.370	18.478

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0018

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

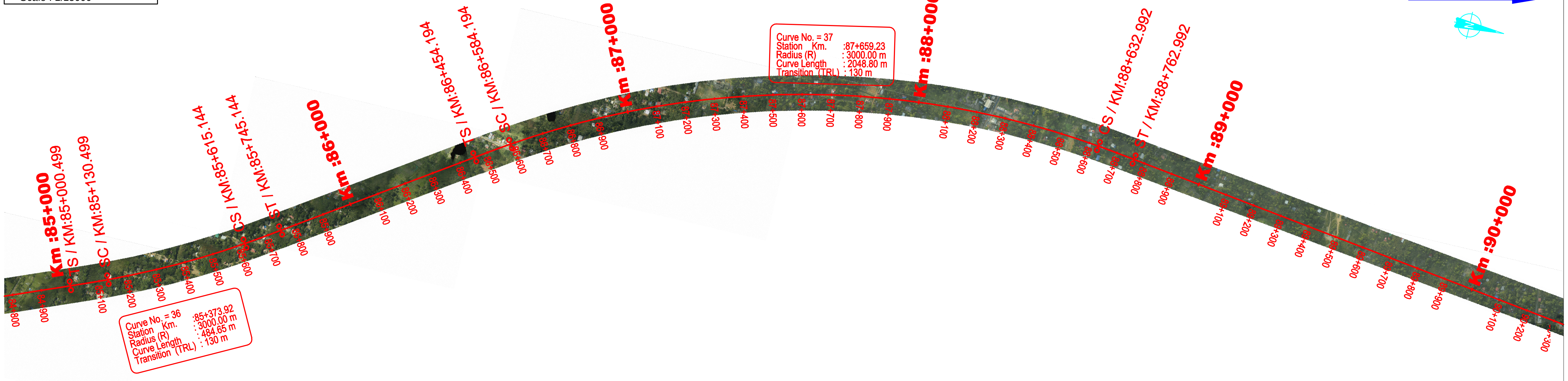
Sheet No : 18 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

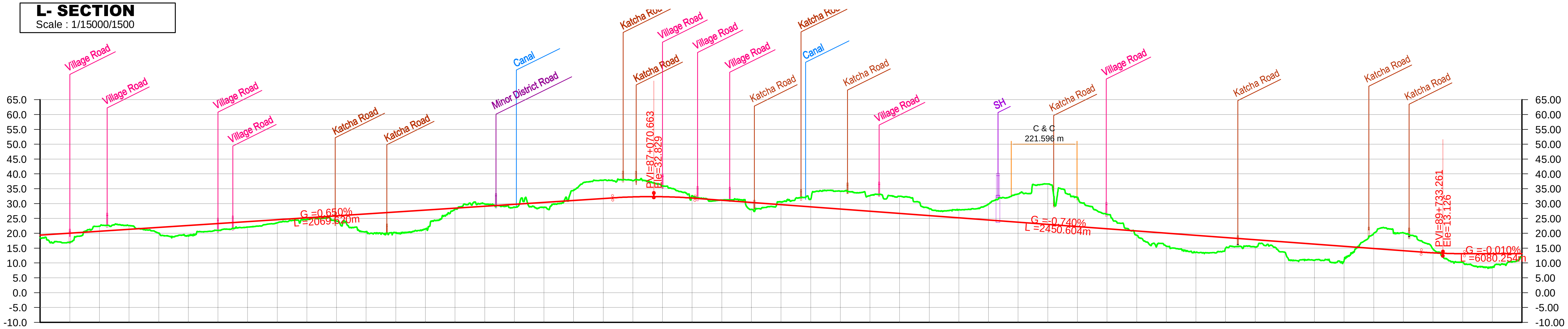
THIRUVANANTHAPURAM ← → KASARAGOD

PLAN :
Scale : 1/15000

LEGEND :-
- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: L =3523.63m; Lt =130m; R =-3000.00m, Lc =484.65m; Lt =130m; L =709.05m; Lt =130m; R =3000.00m, Lc =2048.80m; Lt =130m; L =3250.05m

VERTICAL ALIGNMENT: L =2069.62m, Gr=0.650%; PVC86+931.67; Lvc =277.99m, R=20000; PVT87+209.66; L =2450.60m, Gr=-0.740%; PVC89+660.26; Lvc =146.00m, R=20000; PVT89+806.26; L =6080.25m, Gr=-0.010%

CHAINAGE IN KM	GROUND LEVEL	PROPOSED FORMATION	FILLING HEIGHT	CUTTING DEPTH
85+000	18.478	19.370	0.892	
85+100	16.955	20.020	3.065	
85+200	22.357	20.670		-1.687
85+300	22.554	21.320		-1.234
85+400	20.037	21.970	1.933	
85+500	19.093	22.620	3.527	
85+600	20.961	23.270	2.309	
85+700	22.078	23.920	1.842	
85+800	23.524	24.570	1.046	
85+900	24.660	25.220	0.560	
86+000	24.105	25.870	1.765	
86+100	20.554	26.520	5.966	
86+200	20.290	27.170	6.880	
86+300	21.468	27.820	6.352	
86+400	28.085	28.470	0.385	
86+500	29.853	29.120		-0.733
86+600	28.804	29.770	0.966	
86+700	28.705	30.420	1.715	
86+800	34.412	31.070		-3.342
86+900	37.861	31.720		-6.141
87+000	37.683	32.253		-5.430
87+100	35.968	32.311		-3.657
87+200	32.671	31.870		-0.801
87+300	31.235	31.132		-0.103
87+400	28.082	30.392	2.310	
87+500	30.514	29.652		-0.862
87+600	31.380	28.912		-2.468
87+700	34.152	28.172		-5.980
87+800	32.647	27.432		-5.215
87+900	32.444	26.692		-5.752
88+000	28.300	25.952		-2.348
88+100	27.938	25.212		-2.726
88+200	29.880	24.472		-5.408
88+300	33.276	23.732		-9.544
88+400	36.605	22.992		-13.613
88+500	32.137	22.252		-9.885
88+600	26.419	21.512		-4.907
88+700	19.327	20.772	1.445	
88+800	15.602	20.032	4.430	
88+900	13.593	19.292	5.699	
89+000	15.000	18.552	3.552	
89+100	15.366	17.812	2.446	
89+200	13.610	17.072	3.462	
89+300	10.905	16.332	5.427	
89+400	10.734	15.592	4.858	
89+500	19.982	14.852		-5.130
89+600	20.141	14.112		-6.029
89+700	14.666	13.411		-1.255
89+800	10.177	13.120	2.943	
89+900	8.519	13.109	4.590	
90+000	12.209	13.099	0.890	

Client : K-Rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:
SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:
HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:
SYSTRA / KRDCL / SHSR / DPR / 2020 / AL /0019

General Consultant : SYSTRA

Drawing Scale :
Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 19 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

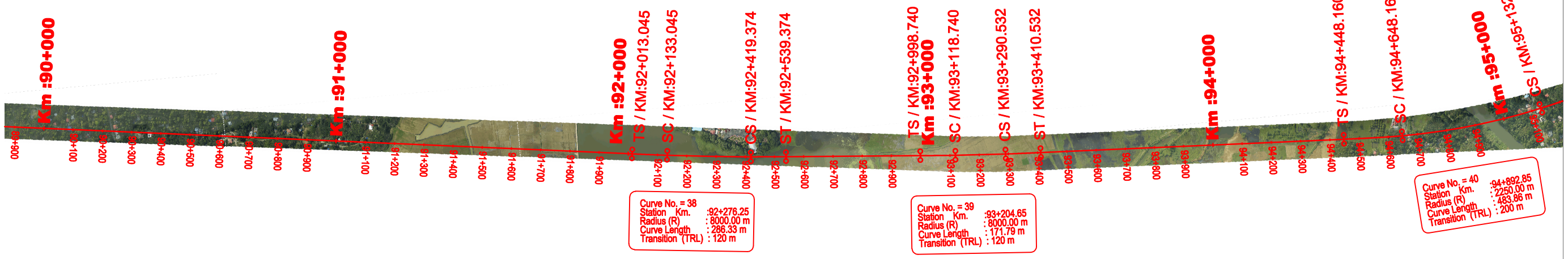
THIRUVANANTHAPURAM

PLAN :
Scale : 1/15000

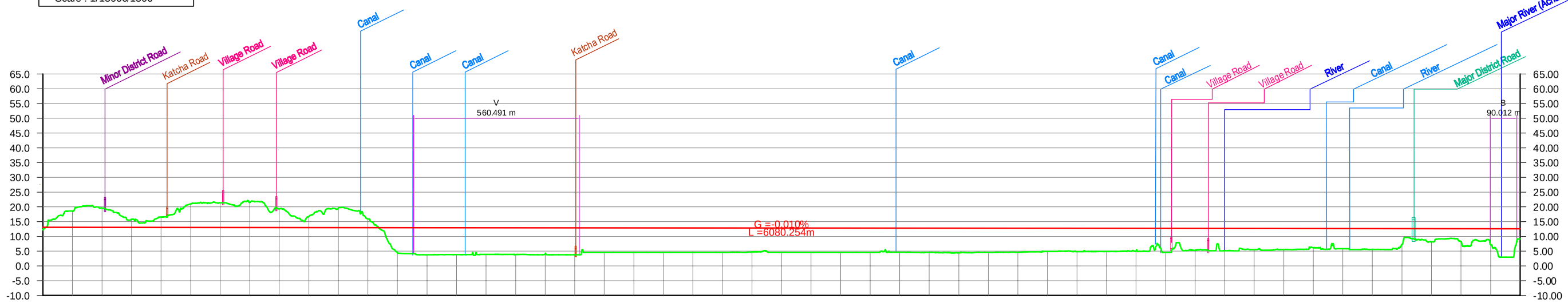
KASARAGOD

LEGEND :-

C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: L =3250.05m | Lt =120m (120m) | R =-8000.00m Lc =286.33m | Lt =120m (120m) | L =459.37m | Lt =120m (120m) | R =-8000.00m Lc =171.79m | Lt =120m (120m) | L =1037.63m | Lt =200m | R =-2250.00m Lc =483.86m

VERTICAL ALIGNMENT: L =6080.25m Gr=-0.010%

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
90+000		0.890	13.089	12.209
90+100	-5.438		13.089	18.527
90+200	-6.490		13.079	19.569
90+300	-2.747		13.069	15.816
90+400	-3.557		13.059	16.616
90+500	-7.964		13.049	21.013
90+600	-8.325		13.039	21.364
90+700	-8.453		13.029	21.482
90+800	-6.286		13.019	19.305
90+900	-3.756		13.009	16.765
91+000	-6.689		12.999	19.688
91+100	-2.930		12.989	15.919
91+200		8.580	12.979	4.399
91+300		9.187	12.969	3.782
91+400		9.129	12.959	3.830
91+500		9.039	12.949	3.910
91+600		9.070	12.939	3.869
91+700		8.827	12.929	4.102
91+800		9.132	12.919	3.787
91+900		8.379	12.909	4.530
92+000		8.369	12.899	4.530
92+100		8.359	12.889	4.530
92+200		8.349	12.879	4.530
92+300		8.339	12.869	4.530
92+400		8.094	12.859	4.765
92+500		8.319	12.849	4.530
92+600		8.309	12.839	4.530
92+700		8.299	12.829	4.530
92+800		8.289	12.819	4.530
92+900		8.223	12.809	4.586
93+000		8.251	12.799	4.548
93+100		8.328	12.789	4.461
93+200		8.254	12.779	4.525
93+300		8.164	12.769	4.605
93+400		7.877	12.759	4.882
93+500		7.919	12.749	4.830
93+600		7.860	12.739	4.879
93+700		7.761	12.729	4.968
93+800		8.179	12.719	4.540
93+900		7.392	12.709	5.317
94+000		7.526	12.699	5.173
94+100		7.178	12.689	5.511
94+200		7.171	12.679	5.508
94+300		6.483	12.669	6.186
94+400		6.807	12.659	5.852
94+500		7.023	12.649	5.626
94+600		5.361	12.639	7.278
94+700		4.449	12.629	8.180
94+800		4.341	12.619	8.278
94+900		5.407	12.609	7.202
95+000		3.373	12.599	9.226

Client :
K-rail
Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:
SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:
HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:
SYSTRA / KRDCL / SHSR / DPR / 2020 / AL /0020

General Consultant :
SYSTRA

Drawing Scale :
Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 20 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

THIRUVANANTHAPURAM

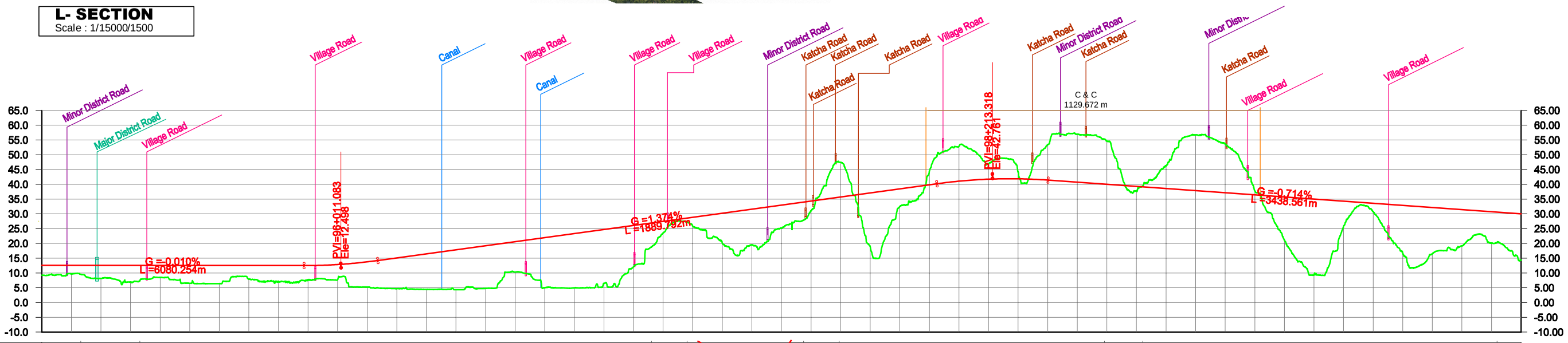
KASARAGOD

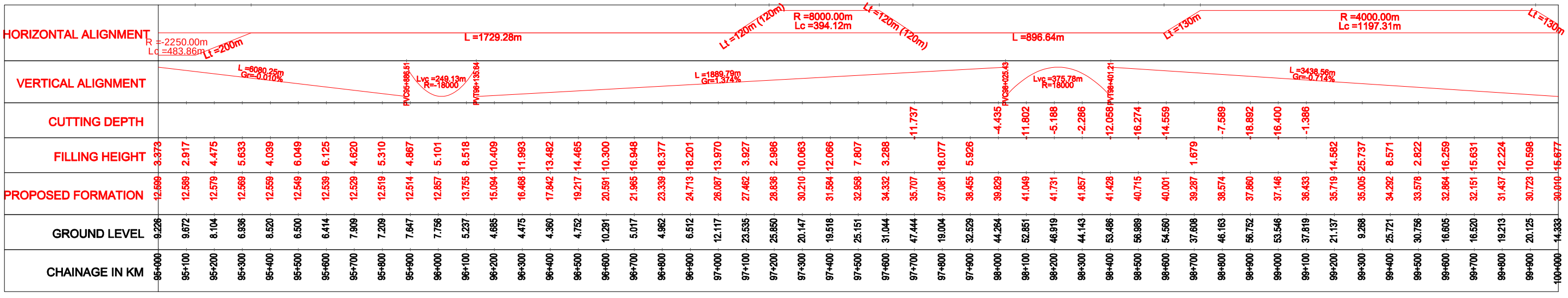
PLAN :
Scale : 1/15000

LEGEND :-

C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE

L- SECTION
Scale : 1/15000/1500





CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
95+000		3.373	12.589	9.226
95+100		2.917	12.589	9.672
95+200		4.475	12.579	8.104
95+300		5.633	12.569	6.936
95+400		4.039	12.559	8.520
95+500		6.049	12.549	6.500
95+600		6.125	12.539	6.414
95+700		4.620	12.529	7.909
95+800		5.310	12.519	7.209
95+900		4.867	12.514	7.647
96+000		5.101	12.857	7.756
96+100		8.518	13.755	5.237
96+200		10.409	15.094	4.685
96+300		11.993	16.468	4.475
96+400		13.482	17.842	4.360
96+500		14.465	19.217	4.752
96+600		10.300	20.591	10.291
96+700		16.948	21.965	5.017
96+800		18.377	23.339	4.962
96+900		18.201	24.713	6.512
97+000		13.970	26.087	12.117
97+100		3.927	27.462	23.535
97+200		2.986	28.836	25.850
97+300		10.063	30.210	20.147
97+400		12.066	31.584	19.518
97+500		7.807	32.958	25.151
97+600		3.288	34.332	31.044
97+700	11.737		35.707	47.444
97+800		18.077	37.081	19.004
97+900		5.926	38.455	32.529
98+000	4.435		39.829	44.264
98+100	11.802		41.049	52.851
98+200	5.188		41.731	46.919
98+300	2.286		41.857	44.143
98+400	12.058		41.428	53.486
98+500	16.274		40.715	56.989
98+600	14.559		40.001	54.560
98+700		1.679	39.287	37.608
98+800	7.589		38.574	46.163
98+900	18.892		37.860	56.752
99+000	16.400		37.146	53.546
99+100	1.386		36.433	37.819
99+200		14.582	35.719	21.137
99+300		25.737	35.005	9.268
99+400		8.571	34.292	25.721
99+500		2.822	33.578	30.756
99+600		16.259	32.864	16.605
99+700		15.631	32.151	16.520
99+800		12.224	31.437	19.213
99+900		10.598	30.723	20.125
100+000		16.677	30.910	14.333

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / A021

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 21 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

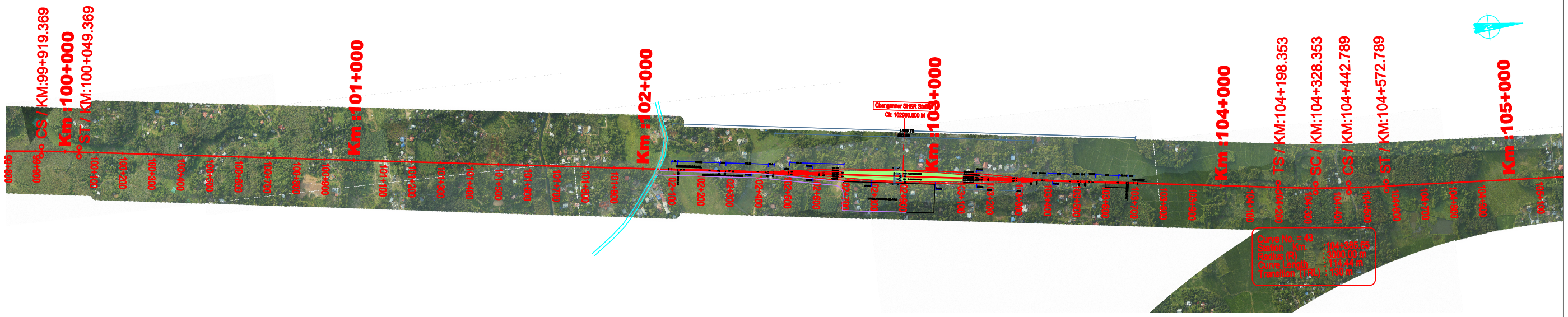
THIRUVANANTHAPURAM

KASARAGOD

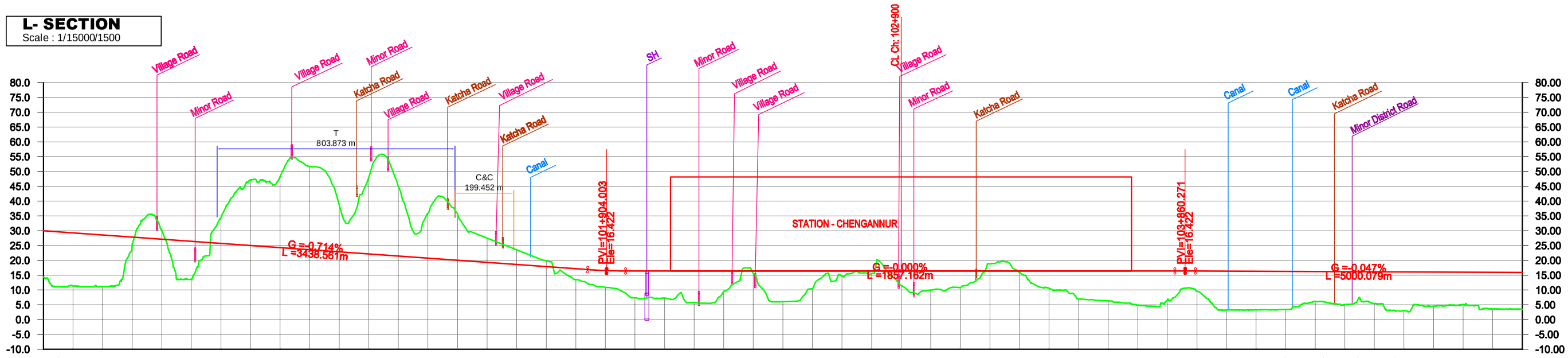
PLAN :
Scale : 1/15000

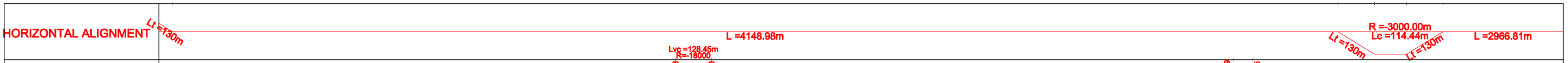
LEGEND :-

C & C - CUT & COVER
T - TUNNEL
V - VIADUCT
B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500





CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
100+000		15.677	30.010	14.333
100+100		17.908	29.296	11.388
100+200		17.460	28.582	11.122
100+300		2.683	27.869	25.186
100+400	-3.029		27.155	30.184
100+500		12.876	26.442	13.566
100+600	-8.661		25.728	34.389
100+700	-22.097		25.014	47.111
100+800	-23.841		24.301	48.142
100+900	-28.145		23.587	51.732
101+000	-15.938		22.873	38.811
101+100	-25.916		22.160	48.076
101+200	-23.491		21.446	44.937
101+300	-15.172		20.732	35.904
101+400	-15.710		20.019	35.729
101+500	-8.166		19.305	27.471
101+600	-4.926		18.591	23.517
101+700	-1.931		17.878	19.809
101+800		3.674	17.164	13.490
101+900		5.639	16.551	10.912
102+000		9.050	16.422	7.372
102+100		9.117	16.422	7.305
102+200		10.695	16.422	5.727
102+300		6.871	16.422	9.551
102+400		0.764	16.422	15.658
102+500		10.372	16.422	6.050
102+600		5.954	16.422	10.468
102+700		1.663	16.422	14.759
102+800		0.829	16.422	15.593
102+900		4.866	16.422	11.556
103+000		6.457	16.422	9.965
103+100		5.633	16.422	10.789
103+200	-2.407		16.422	18.829
103+300		0.565	16.422	15.857
103+400		5.839	16.422	10.583
103+500		9.456	16.422	6.966
103+600		10.105	16.422	6.317
103+700		11.584	16.422	4.838
103+800		9.809	16.422	6.613
103+900		6.842	16.403	9.561
104+000		13.089	16.357	3.268
104+100		13.021	16.310	3.289
104+200		12.830	16.264	3.434
104+300		10.065	16.217	6.152
104+400		11.037	16.171	5.134
104+500		10.667	16.124	5.457
104+600		13.017	16.078	3.061
104+700		11.523	16.031	4.508
104+800		10.895	15.985	5.090
104+900		12.394	15.938	3.544
105+000		12.422	15.892	3.470

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0022

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 22 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

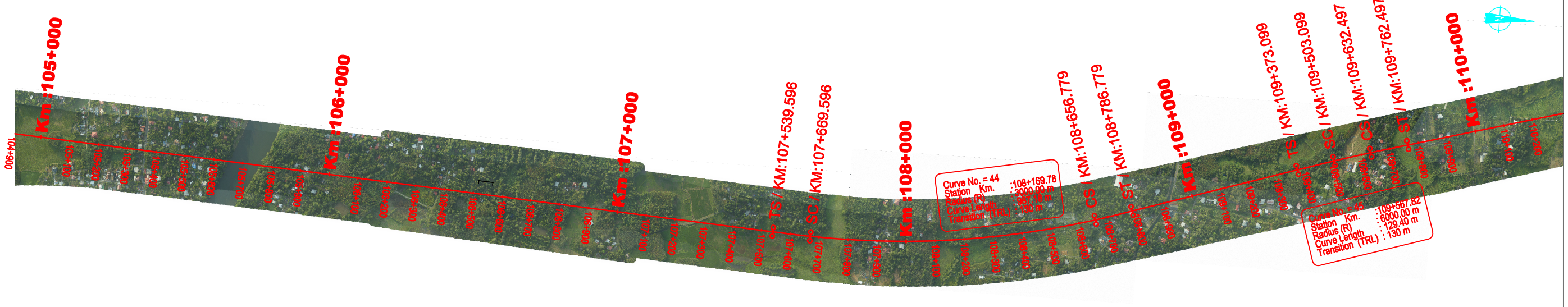
THIRUVANANTHAPURAM

KASARAGOD

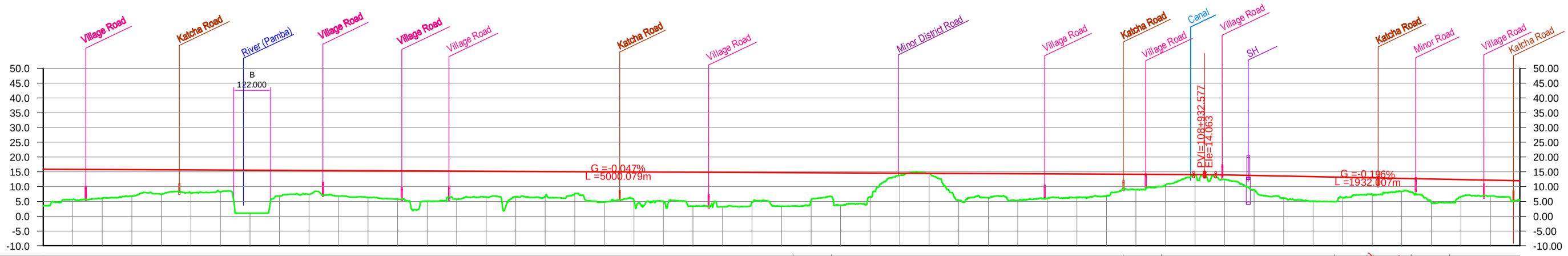
PLAN :
Scale : 1/15000

LEGEND :-

- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: L =2966.81m; Lt =130m; R =-3000.00m, Lc =987.18m; Lt =130m; L =586.32m; Lt =130m (130m); R =6000.00m, Lc =129.40m; Lt =130m (130m); L =1562.33m

VERTICAL ALIGNMENT: L =5000.08m, Gr=-0.047%; PVI=108+895.23; PVI=109+569.92; L =1932.01m, Gr=-0.196%

Lvc =74.69m, R=50000

CHAINAGE IN KM	GROUND LEVEL	PROPOSED FORMATION	FILLING HEIGHT	CUTTING DEPTH
105+000	3.470	15.892	12.422	
105+100	5.665	15.845	10.180	
105+200	6.112	15.799	9.687	
105+300	6.846	15.752	8.906	
105+400	7.327	15.706	8.379	
105+500	7.844	15.659	7.815	
105+600	8.309	15.613	7.304	
105+700	1.050	15.566	14.516	
105+800	6.761	15.520	8.759	
105+900	7.360	15.473	8.113	
106+000	6.781	15.427	8.646	
106+100	6.293	15.380	9.087	
106+200	5.771	15.334	9.563	
106+300	5.128	15.287	10.159	
106+400	5.754	15.241	9.487	
106+500	6.536	15.194	8.658	
106+600	6.619	15.148	8.529	
106+700	6.607	15.101	8.494	
106+800	7.645	15.055	7.410	
106+900	4.804	15.008	10.204	
107+000	5.350	14.962	9.612	
107+100	5.077	14.915	9.838	
107+200	3.353	14.869	11.516	
107+300	3.206	14.822	11.616	
107+400	4.726	14.776	10.050	
107+500	3.390	14.729	11.339	
107+600	5.392	14.683	9.291	
107+700	3.714	14.636	10.922	
107+800	6.588	14.590	8.002	
107+900	13.790	14.543	0.753	
108+000	14.574	14.497		-0.077
108+100	5.420	14.450	9.030	
108+200	6.206	14.404	8.198	
108+300	5.326	14.357	9.031	
108+400	6.099	14.311	8.212	
108+500	6.418	14.264	7.846	
108+600	6.894	14.218	7.324	
108+700	8.980	14.171	5.191	
108+800	10.541	14.125	3.584	
108+900	14.064	14.078	0.014	
109+000	12.417	13.931	1.514	
109+100	8.919	13.735	4.816	
109+200	6.106	13.539	7.433	
109+300	5.088	13.343	8.255	
109+400	6.310	13.147	6.837	
109+500	7.466	12.951	5.485	
109+600	8.402	12.755	4.353	
109+700	4.529	12.560	8.031	
109+800	6.497	12.364	5.867	
109+900	6.855	12.168	5.313	
110+000	5.449	11.972	6.523	

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM KOLLAM TO CHENGANNUR

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0023

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 23 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission

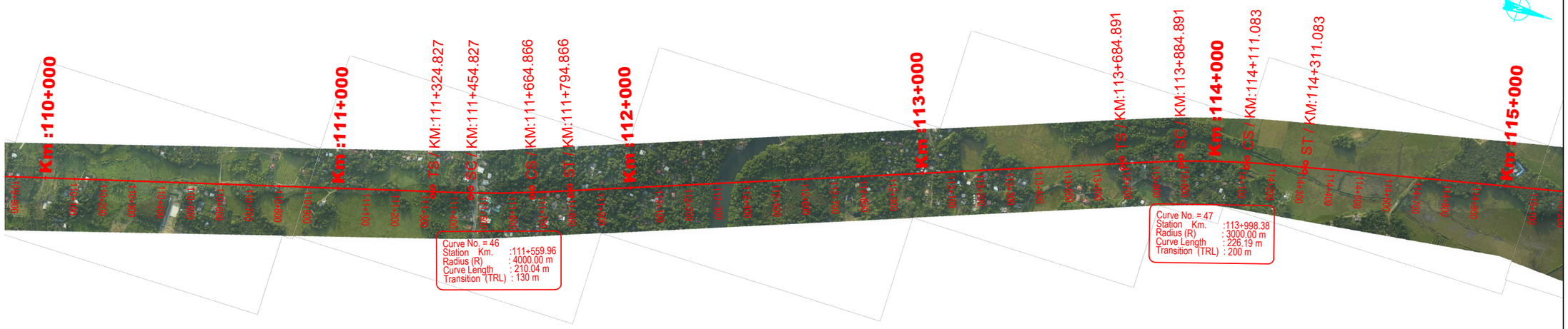
THIRUVANANTHAPURAM

KASARAGOD

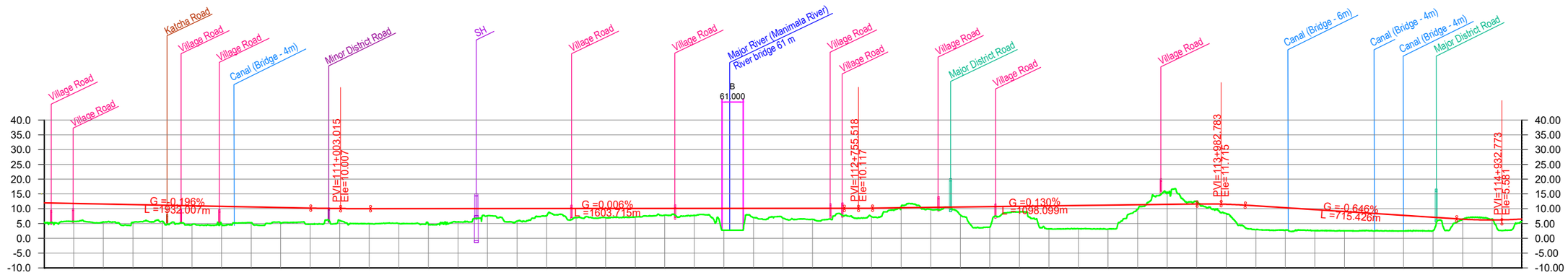
PLAN :
Scale : 1/15000

LEGEND :-

- C & C - CUT & COVER
- T - TUNNEL
- V - VIADUCT
- B - RIVER BRIDGE



L- SECTION
Scale : 1/15000/1500



HORIZONTAL ALIGNMENT: L =1562.33m; Lt =130m; R =-4000.00m, Lc =210.04m; Lt =130m; L =1890.02m; Lt =200m; R =3000.00m, Lc =226.19m; Lt =200m; L =3821.18m

VERTICAL ALIGNMENT: L =1932.01m, Gr=-0.196%; PVC110+901.83; Lvc =202.17m, R=-100000; PVT111+104.10; L =1603.71m, Gr=0.006%; PVC112+707.41; Lvc =95.41m, R=-77000; PVT112+803.22; L =1098.10m, Gr=0.130%; PVC113+901.32; Lvc =162.92m, R=21000; PVT114+064.24; L =715.43m, Gr=-0.646%; PVC114+779.67; Lvc =306.20m, R=-18000

CHAINAGE IN KM	CUTTING DEPTH	FILLING HEIGHT	PROPOSED FORMATION	GROUND LEVEL
110+000		6.506	11.972	5.466
110+100		6.093	11.776	5.683
110+200		6.011	11.580	5.569
110+300		6.028	11.384	5.356
110+400		5.453	11.188	5.735
110+500		6.355	10.992	4.637
110+600		6.116	10.797	4.681
110+700		5.314	10.601	5.287
110+800		5.209	10.405	5.196
110+900		5.481	10.209	4.728
111+000		4.038	10.061	6.023
111+100		5.090	10.013	4.923
111+200		5.027	10.019	4.992
111+300		5.490	10.026	4.536
111+400		4.487	10.032	5.545
111+500		2.439	10.038	7.599
111+600		4.247	10.045	5.798
111+700		2.421	10.051	7.630
111+800		3.048	10.057	7.009
111+900		3.097	10.063	6.966
112+000		2.866	10.070	7.204
112+100		2.237	10.076	7.839
112+200		2.415	10.082	7.667
112+300		7.371	10.088	2.717
112+400		3.075	10.095	7.020
112+500		3.312	10.101	6.789
112+600		3.712	10.107	6.395
112+700		2.289	10.114	7.825
112+800		2.862	10.175	7.313
112+900	-0.142		10.305	10.447
113+000		0.673	10.435	9.762
113+100		2.597	10.565	7.968
113+200		6.944	10.696	3.752
113+300		1.891	10.826	8.935
113+400		7.784	10.956	3.172
113+500		7.881	11.086	3.205
113+600		8.102	11.216	3.114
113+700		1.545	11.347	9.802
113+800	-3.894		11.477	15.371
113+900	-0.929		11.607	12.536
114+000		3.132	11.505	8.373
114+100		8.065	10.958	2.893
114+200		7.609	10.312	2.703
114+300		7.101	9.667	2.566
114+400		6.514	9.021	2.507
114+500		5.927	8.375	2.448
114+600		5.268	7.730	2.462
114+700		4.533	7.084	2.551
114+800	-0.044		6.450	6.494
114+900	-0.325		6.195	6.520
115+000		0.892	6.496	5.603

Client :

K-rail

Address:
K-Rail Development Corporation Ltd
5th Floor,Trans Towers,
Vazhuthacaud,Thiruvananthapuram,Kerala-695014

Project Title:

SILVER LINE PROJECT FROM THIRUVANANTHAPURAM TO KASARAGOD

Drawing Name:

HORIZONTAL PLAN AND LONGITUDINAL SECTION FROM CHENGANNUR TO KOTTAYAM

Drawing No:

SYSTRA / KRDCL / SHSR / DPR / 2020 / AL / 0024

General Consultant :

SYSTRA

Drawing Scale :

Horizontal Scale : 1 : 15000 (H)
Vertical Scale : 1 : 1500 (V)

Sheet No : 24 of 108

DATE	DRAWN	SIGN	DESIGN	SIGN	CHECKED BY	SIGN	REVIEWED BY	SIGN	APPROVED BY	SIGN	REV.	DESCRIPTION
20/03/2020	RESMI		B. B. BEHERA		C.M. BALAN		A. P. SHARMA		PROJECT DIRECTOR		0	First Submission